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NEW ZEALAND
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ALONG the west coast of the southern part of the North Island from Paekakariki in the south to Patea in the north and extending inland for from two to 12 miles is a belt of sand country covering 270,000 acres. Most of it is suitable for farming, horticulture, or forestry, but large areas are only partly developed and production generally is low. However, many high-producing farms in the area have shown that with improved management the production can be raised considerably, and an impressive example of the improvement possible is the 243-acre property of a rehabilitated ex-serviceman, Mr T. O. Phillips, who by careful planning of his management and by hard work has in seven years raised production well above the average for this class of country, even though development is by no means complete. His success clearly illustrates the potential of much of the large area of sand country in the lower part of the North Island.

By J. A. GRAHAM,
Instructor in Agriculture,
Department of Agriculture,
Palmerston North

Studies in Farm Management

Manawatu Sand Country Fat-lamb Farm

← Ewes and lambs grazing on improved pasture. The area is drained throughout with grassed waterways.

THE sand country consists of a complex of dunes, sand plains, and small peaty areas, and apart from the last named the soils are formed from wind-blown sand. The young dunes near the coast are mainly raw sand with little vegetative cover and are unsuitable for good pasture growth, but the older, consolidated, inland dunes have a fair cover of dark topsoil and can produce fairly good pastures.

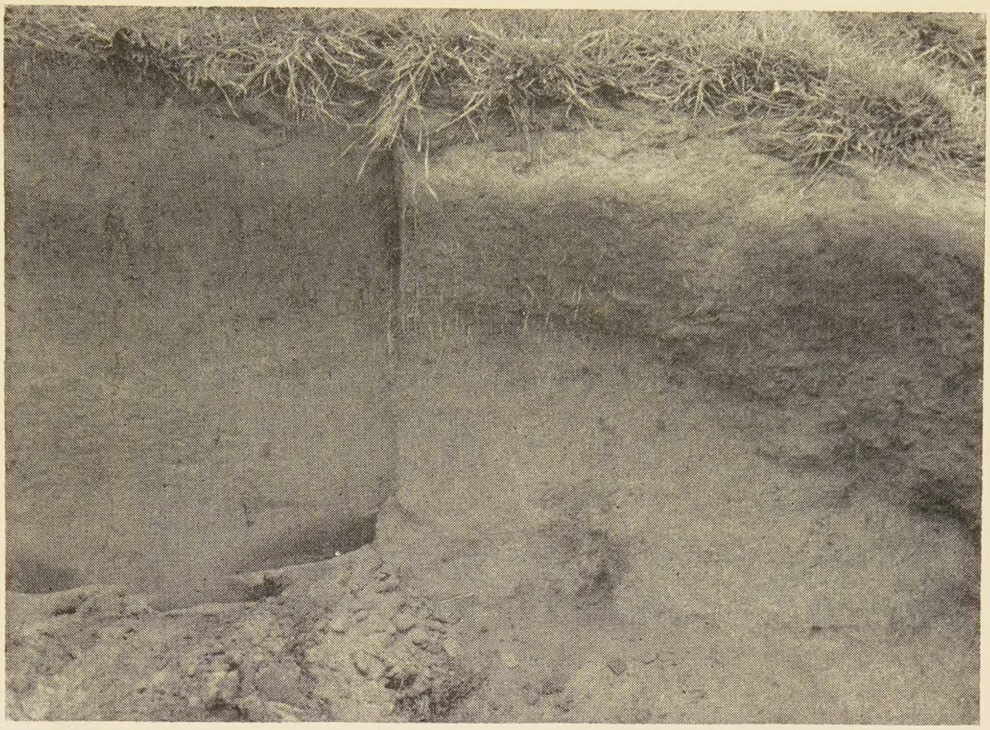
Between the dunes are extensive sand plains which range from flattish to gently undulating, and the height of the water table is very variable. Drainage of the flat land is impeded in places by the dunes, and where drainage is very poor the soil stays wet for most of the year. At the other extreme are the excessively drained areas, where the subsoil is wet in winter only.

Much of the flat land, however, is intermediate between these extremes and, provided excess surface water is removed by artificial drainage, it will maintain good pasture growth throughout the year. The soils may, however, vary from paddock to paddock or even within paddocks, and very few farms consist of a single soil type.

The soils are moderately supplied with plant nutrients, but are generally low in potash and respond to phosphates and lime. Copper deficiency in stock is general and it is standard practice to topdress with copperised superphosphate. In addition, cobalt deficiency is suspected, and trials carried out by the Department of Agriculture and veterinary clubs have shown growth responses in lambs dosed with selenium.

Climate

The climate is characterised by warm summers and fairly mild winters, with a reliable and evenly distributed rainfall, but conditions are generally somewhat drier than in inland districts. The prevailing winds are north to north-west and frequently reach gale force. They are more frequent in spring than at other times of the year and often cause loss of soil moisture in September, when the rainfall is normally low. Warm, dry conditions usually prevail in summer and drought conditions frequently occur on the dry, light soils. Autumn is usually warm and settled and the winters are cool and wet with frequent frosts.



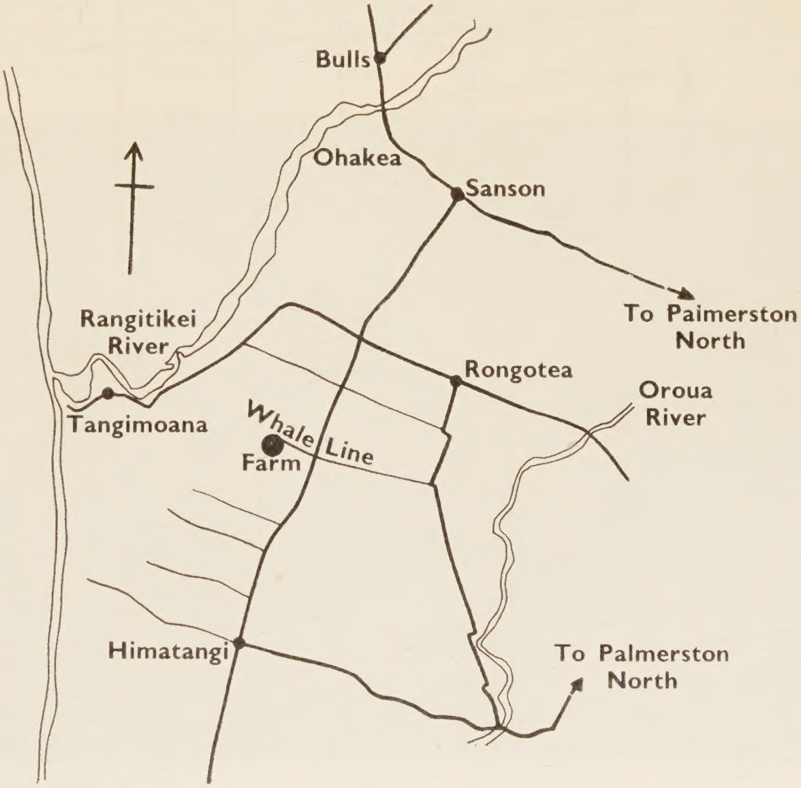
The consolidated dunes have a thick layer of dark soil overlying sand. They can produce good pasture if properly managed.

Utilisation

Large areas of the sand country still remain undeveloped, mainly owing to lack of soil moisture, but many areas, too, tend to be too swampy and are difficult to drain because of the sand ridges which lie across the whole area. Such undeveloped areas are used mainly for winter runoff for dairy stock. Development has been confined mainly to the more fertile of the imperfectly draining soils where soil moisture is adequate for pasture growth throughout the year.

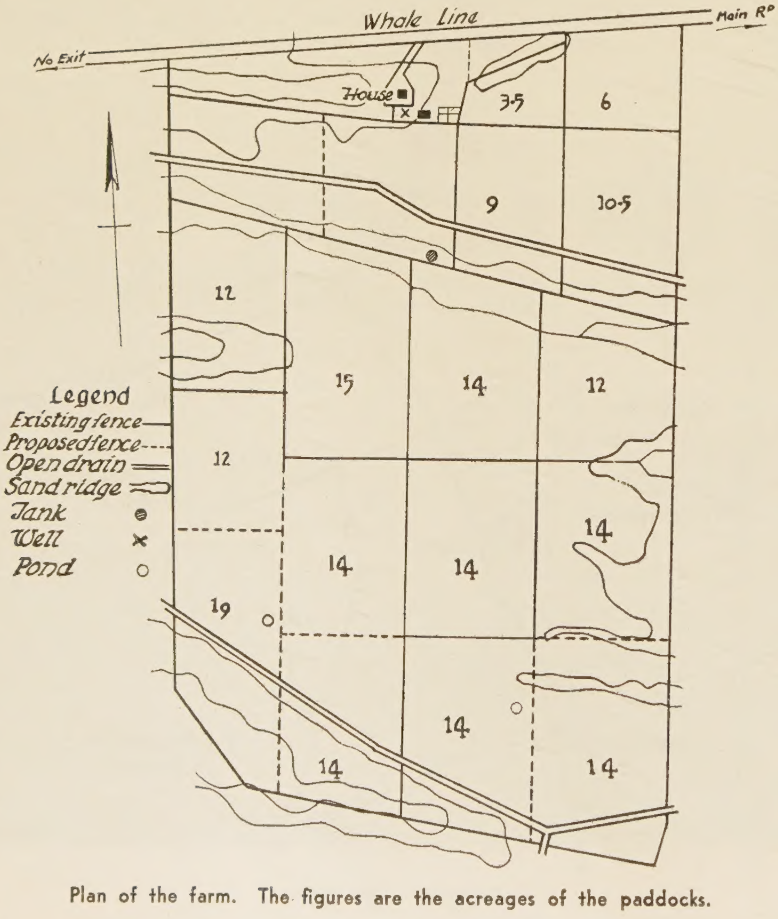
Most farms contain a proportion of drier country in the form of consolidated dunes or dry sand flats as well as wetter flats. For this reason, the sand country lends itself admirably to dairying, since it is possible to graze stock on the wetter land during the dry season and winter them on the drier flats and ridges when pastures on the wetter flats can be damaged by pugging. However, it is the manner and proportion in which the various soil types, sub types, and phases are associated that determine the overall land use.

Apart from a strip along the coast and a few large blocks further inland, the sand country is semi-intensively farmed, dairying being the main type, but sheep and cattle being carried on the larger farms. Cropping is mainly confined to supplementary feed crops,



Location of the farm.

When the property was taken over rushes were fairly thick on poorly drained areas. This pasture is reverting to rushes through lack of drainage.



Plan of the farm. The figures are the acreages of the paddocks.

but the growing of barley for grain is increasing. The general level of production from the sand country is low, though experience from many established farms has shown that most of the area could be further developed and that with improved management production could be raised considerably.

DEVELOPMENT OF PROPERTY

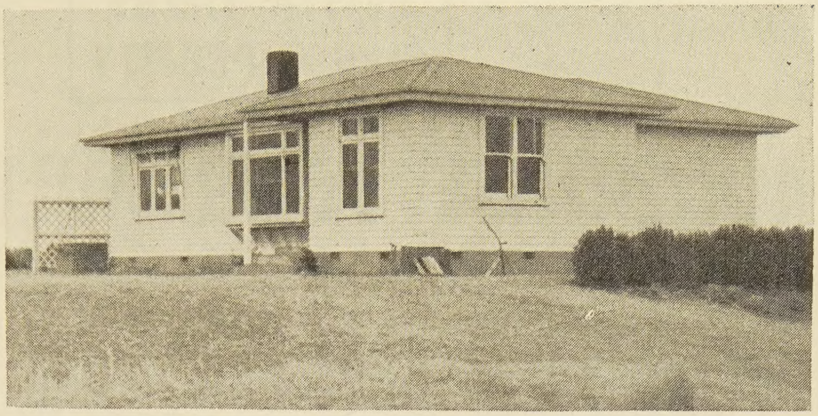
Mr Phillips's farm, of 243 acres, was formerly part of a large estate and was made available for settlement to an ex-serviceman in 1953. Mr Phillips, who was successful in the ballot, took possession in March of that year.

The land comprises about 225 acres of good-quality, ploughable sand flats which are crossed by two low consolidated sand ridges which cover about 20 acres. The flats have a high moisture holding capacity and do not dry out excessively, but water may lie on the surface for short periods during winter and spring, especially where drainage is poor. High-producing ryegrass - white clover pasture can be maintained on the flats with correct grazing and fertilising management. The ridges, which can be traversed by wheeled tractor, dry off in summer but produce remarkably well for most of the year. Subterranean clover grows well on the drier parts of the farm. The soils are mostly moderately acid, well supplied with calcium, and moderately supplied with phosphate and nitrogen, but are low in potash.

The district is subject to strong and persistent winds which have an adverse effect on stock and plant growth; adequate shelter belts would undoubtedly considerably benefit stock and plants. The prevailing winds, westerly and north-westerly, are usually the strongest, but tend to be warm and humid. Strong easterly winds, however, are often cold and dry and cause evaporation of moisture which often checks pasture growth at critical periods. When blowing off the snow-covered Tararua Range, especially if accompanied by rain, they can also cause heavy losses of newborn lambs. The 35 in. of rain per annum is one of the lowest in the North Island, but the average distribution is generally so good that this fact is perhaps not generally realised. Abnormal periods of heavy rain or drought can occur, however, almost at any time of the year, and can have a very marked effect on management, pasture growth, and stock and farm returns.

Property at Take-over

When the property was taken over the area was in fair mixed pasture with native grasses on the ridges. The clovers were weak in parts and lacked vigour. Rushes were fairly thick on the poorly drained areas. Planted shelter was needed, especially as there



A new homestead, on a consolidated dune, was occupied 14 months after the property was taken over.

was a risk of sand blows developing. The existing fencing was fair to poor and totally inadequate; in fact, apart from an 8-acre area which had been fenced off and sown in crop by the Department of Lands and Survey, there were only two paddocks on the farm. There were no house or other buildings and no water supply, sheep yards, electric power, or telephone. A formed no-exit road just reached one corner of the property. It was estimated that when developed the farm would carry about 800 ewes.

Fourteen months later a new house was ready for occupation, electric power and the telephone had been installed, and the county council had formed and metalled the road to the front gate. The State Advances Corporation made loan finance available for most of the first year's building and development, but all subsequent development costs have been met out of income and this has limited the rate of progress.

Fencing

Careful thought was given to the most suitable plan of subdivision and in that finally chosen the transverse sand ridge crossing the farm about 15 chains back from the road was taken as a dividing line between the front and back of the farm. The plan provided for 12 paddocks, four wide and three deep, on the back portion and nine paddocks based around the sheepyards and homestead at the front, and varying in size from small holding paddocks of 1 to 3 acres up to 12 acres. The approach was to fence off each year the paddock to be ploughed out of grass and put up such other fencing as finance and time would permit. This has meant retaining some relatively large paddocks, one of which is still 66 acres, and as a result stock management has been very inconvenient. However, it is expected that subdivision will be completed in about three to four years.

Water Supply

Throughout the sand country water can usually be found at depths of 12 or 15 ft and shallow wells are frequently used for stock water supplies. The water from these, however, is not particularly good, being discoloured by ironstone and often murky. An alternative method adopted on this farm was to sink a deep well to 180 ft and reticulate the water around the whole farm from the one source. Water from deep wells is clear, though hard, and remains fairly clean in the troughs.

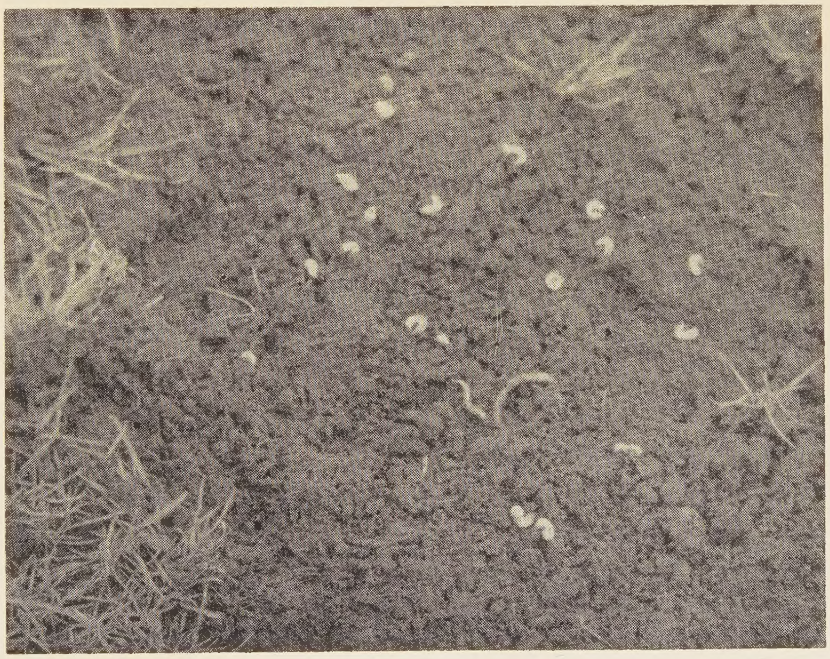
In the first year two water holes were bulldozed at the back of the farm, but it was found that though this type of water hole gives plenty of water when it is not needed it gradually deteriorates to shallow sludge.

Water is pumped directly by a high pressure pump to the front paddocks and to a 1,000-gallon concrete tank on the subdividing ridge. Troughs in the back paddocks are gravity fed from the storage tank, the first 15 chains of main piping from the tank being of 1 in. polythene and the remainder ¾ in. From the main pipeline ¾ in. leads are taken to the various paddocks and a flow of 140 gallons per hour has been measured at 30 chains from the tank.

Fertilisers

In the first few years straight superphosphate was applied at 2½ cwt per acre to all pasture, but subsequently the farmer found out that the area was classified as borderline deficient in both copper and cobalt, and though no deficiency was apparent in the stock, he thought it prudent to take some precautions. In addition he became aware that the whole of the sand country, including the wetter flats, is subject to severe infestation with grass grub and subterranean caterpillar. Though damage by these pests is not always spectacular, there is serious loss of vigour and mortality in high-producing pasture species, notably ryegrass, which tends to have a short life on most of the sand country.

With these factors in mind the manurial programme has been modified and 7 tons of straight superphosphate, 7 tons of copperised-cobaltised



All the sand country is subject to infestation with grass grub and subterranean grass caterpillar.

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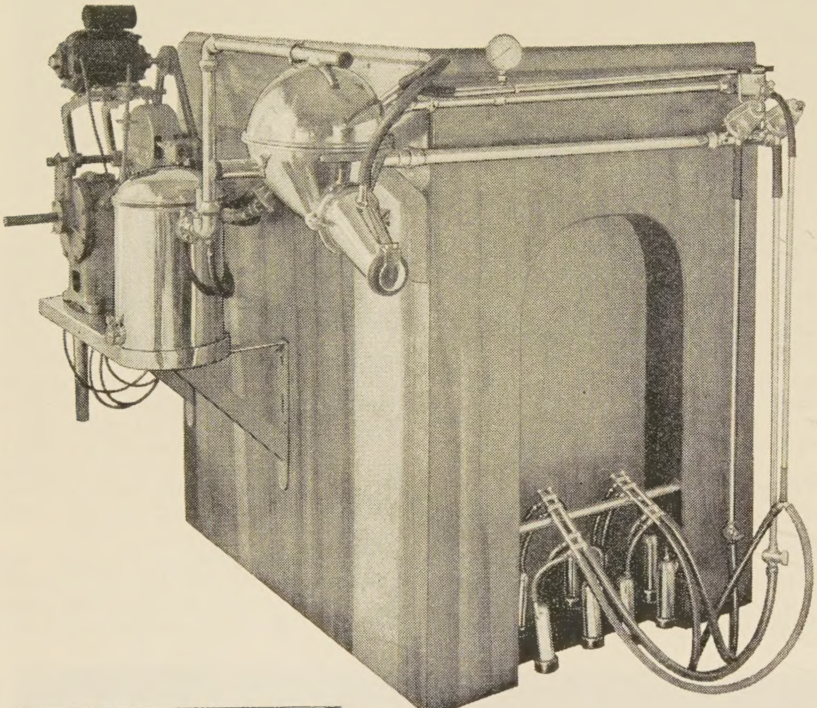

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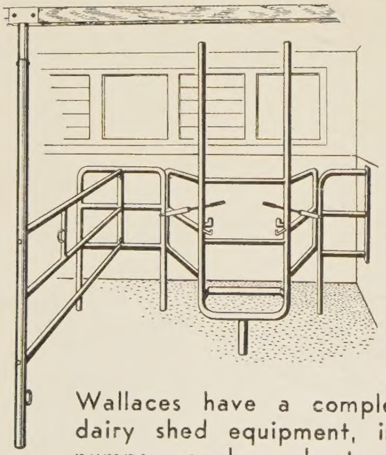

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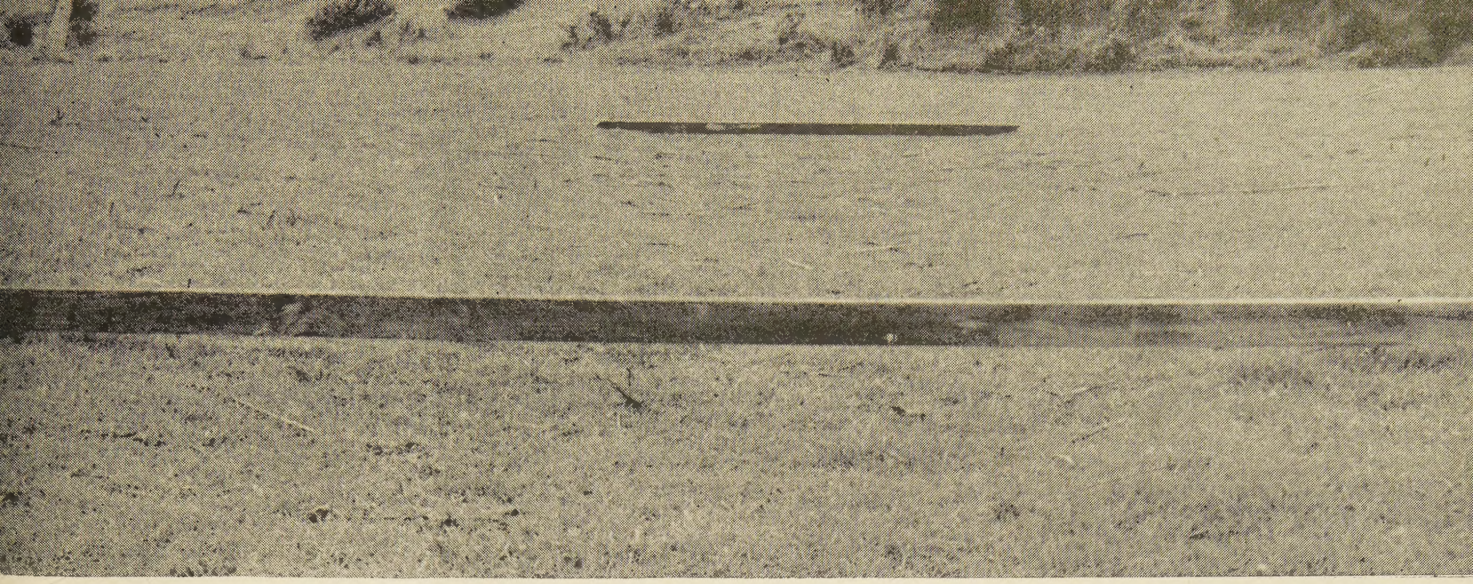


A grassed waterway. The timber laid across it illustrates the shallowness and width of the waterways.

superphosphate, and 7 tons of DDT superphosphate are applied to the pastures annually. Potash has given good responses on the farm and it is likely that this fertiliser will be applied regularly in future. Lime has been used to a limited extent, but except in lucerne little response has been seen and its use has been discontinued meantime.

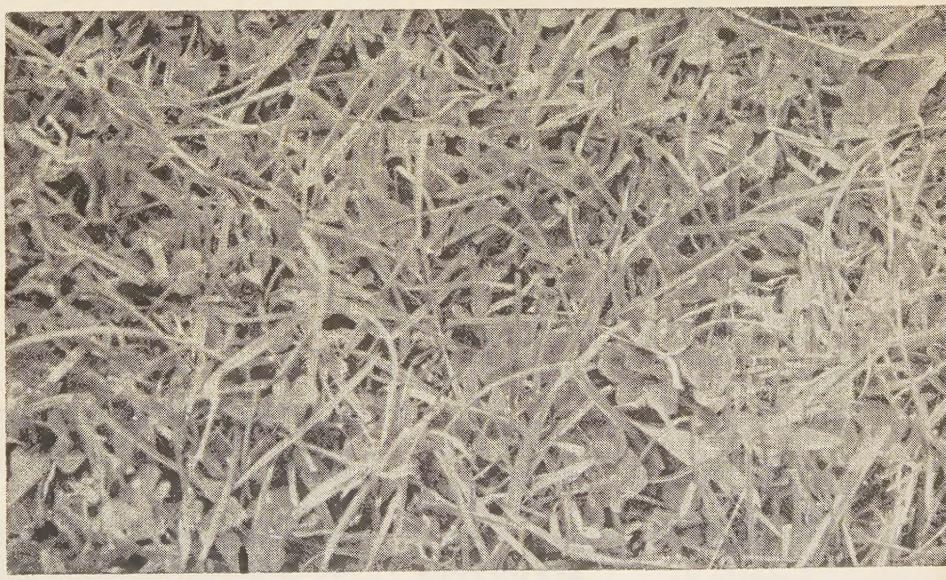
Crops

Chou moellier grown each year for winter feed in a paddock ploughed out of grass in spring is followed by rape for lamb fattening the following year. Both crops are sown with a fertiliser mixture containing equal parts of blood and bone and serpentine superphosphate at 3 cwt per acre. After the rape is fed off the paddock is sown back to grass in autumn. DDT superphosphate at 3 cwt per acre is applied to the new grass in autumn and an additional 2 cwt of potassic superphosphate the following spring.

To speed up pasture renewal it would probably be better to follow the chou moellier with a crop of barley and plough up an additional grass area for the rape crop and so put down two new grass paddocks each year, but until subdivision is complete this would be difficult. Barley grows very well on the sand country and is grown fairly extensively in the district. Only one crop of barley has been grown on this farm and in a difficult harvesting season the yield was only 45 bushels per acre. However, in a normal season the average yield in the district is very much higher. Ryecorn has been grown twice for green feed on the farm with very good results, and though no seed was harvested from these crops. the district's potential for growing limited areas of this cereal for grain appears to be good.

▼ Grassed waterways after heavy rain.

Oversown pasture which six → years ago contained no clover.



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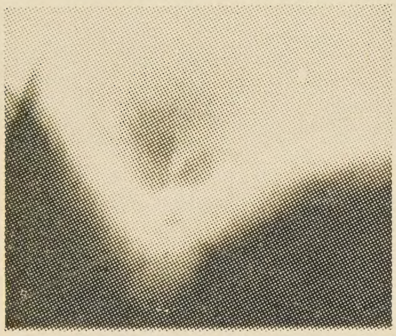
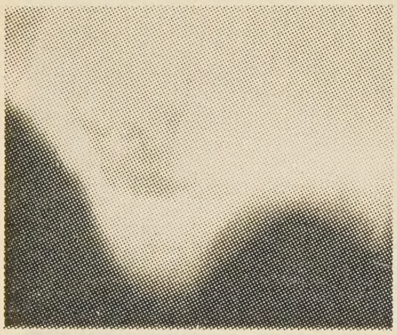


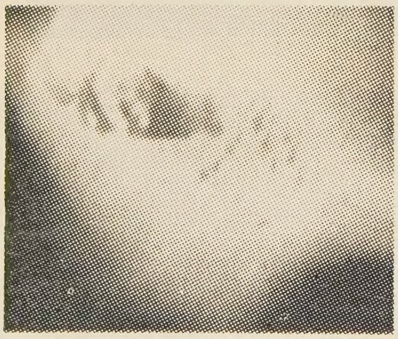
RIGHT AFTER TREATMENT

Some ointment is still stuck in teat canal.



1 HOUR LATER

Ointment balls up; antibiotic release delayed.

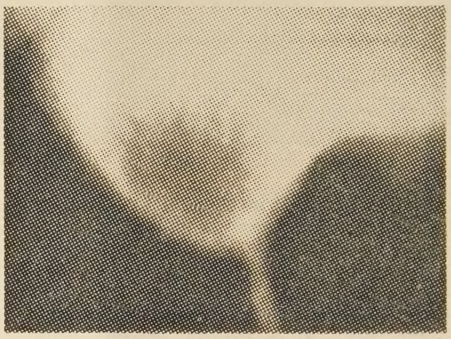


4 HOURS AFTER TREATMENT

Gobs of goo are still present in the udder.

Only antibiotic particles clinging to the outside of the ointment globs are available to go into solution for fighting mastitis. Treatment is slowed down . . . and cows never have the benefit of full antibiotic release any time within a single milking period. Photos show that even up to 4 hours after treatment, ointment treatments are still in globs.

LIQUID TERRAMYCIN-TYPE FORMULA



RIGHT AFTER TREATMENT

Liquid formula disperses fast after treating.

1 HOUR LATER

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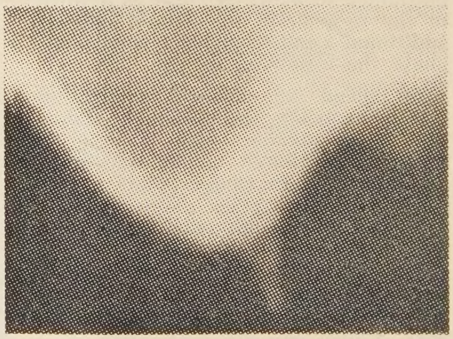

4 HOURS AFTER TREATMENT

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On the left of the fence is improved pasture and on the right is unimproved, rush-infested pasture.

A 6-acre paddock of lucerne was sown on the farm in the first year to provide hay until the property was sufficiently subdivided for pastures to to be closed up for hay. Fair crops were harvested from the area and the investment was well worth while in the circumstances, but the paddock tended to be too wet and after serving its purpose for a few years was ultimately treated as a grazing area. Because of the frequency of showers in summer it has been difficult at times to make good lucerne hay, especially as the farmer did not have his own harvesting equipment.

Drainage

Though the soils of the sand country are free draining, most of the low-lying flats are very wet because of a persistently high water table which at times is at or above soil level. Artificial improvement of drainage is therefore an important factor in increasing production. The sandy soil will not permit the use of tiles or moles and in any case deep drainage is not advisable, as the soil contains little clay to hold moisture and a reasonably high water table is necessary for good pasture growth. Drainage should therefore aim at the removal of surface water only and for this purpose broad V-shaped drains have been found most suitable.

Various methods have been used on this farm to form V drains or, more correctly, dished grassed waterways. Roadgraders, bulldozers, light tractor grader blades, and ploughing have all been used. Each has its use, the bulldozer being the most satisfactory for the larger main or V drains and the others individually or in conjunction for the shallower grassed waterways.

The most satisfactory and cheapest method used has been to plough with the fall of the land or, where a large main drain follows the main fall in slightly undulating country, to plough across the main drain and form the plough finishes into dished waterways. With this method the mark outs and finishes are made at or about the same place each time. The paddocks are ploughed and after two or more successive ploughings the finishes constitute substantial drains. Before the areas are sown back to grass the tractor grader is used to open drains through the headlands to similar finishes in the adjoining paddock.

The tractor grader or preferably a road grader is used to true the levels of finishes and to spread the ridge soil near the double or triple strike-outs. With lands 2 chains wide this gives about 1 mile of waterway for each 14 acres.

This method enables the whole area to be drained to a plan and is quite satisfactory even though in some paddocks the general fall may be diagonally across the line of ploughing. The side crests of these shallow drains vary from 10 to 20 ft apart and the drains can be crossed at any place by truck or tractor without much reduction in speed.

The farmer has tried other methods, including wandering drains which follow the lowest ground, but he found that the earth thrown out tended to impede the flow of water and when the paddock is cultivated these drains tend to be filled in and have to be re-formed. With the ploughing method these disadvantages are overcome and the waterways can be deepened or maintained at very little cost at any subsequent ploughing. In addition the slightly elevated strike-out lines provide firm ground for wheeled traffic in the wettest of weather.

Pasture Mixtures

Several mixtures of pasture seeds were tried in the earlier years and were usually sown at 35 lb per acre. Crested dogstail, Montgomery red clover, and subterranean clover were included in the past, but it was found that the red clover did not persist well enough to warrant its inclusion and the other two appear as volunteers in the pastures anyway. Though Mr F. E. T. Suckling, Grasslands Division, Department of Scientific and Industrial Research, has reported very heavy counts of subterranean clover seed in the soil in the Oroua Downs district, worth-while results on this farm have been obtained from oversowing dry ridges and elevated ground with both subterranean and white clover seed. The seeding rate for new pastures has been reduced to 25 lb per acre and the following seeds mixture, which is being used at present, has given good results.

	lb
Permanent pasture perennial ryegrass	10
Standard short-rotation ryegrass	8
Mother cocksfoot (Grasslands strain)	3
Certified timothy	2
Mother white clover	2
	25

The seed is sown with a roller drill and strikes have invariably been good. Last year the seedbed was tractor-rolled before sowing and the farmer was very impressed with the results.

Stock Management

The rams are put out with the ewes about 1 March or during the last week of February. The ewes are mob-stocked from weaning until lambing begins and are set-stocked from then until weaning. They are put on winter crop at a date that will permit the crop, except for the stems, to be fed off before lambing begins. Just before lambing the flock is sorted and, except perhaps for the dry ewes and late lambers, the ewes are put on to saved grass. At this time the cattle are shifted on to the crop paddock to clean up the chou moellier stems and are given hay as a supplement.

Rape is a crop which is now not grown very extensively in the North Island, but growing it for summer feed is an integral part of the policy on this farm. The crop is sown so that it will be ready for feeding off by 1 February if the season permits.

Having a crop available means that unfinished lambs need not be sent away in early drafts if a dry season seems likely. Also the crop provides a safe feed for stock during the facial eczema danger period from early February to late March. In addition by having the lambs on the crop from 1 February onward, all of the grass paddocks are available for flushing the ewes for three or four weeks before they are put to the ram; in this way the farmer believes that the crop is having an indirect effect in increasing lambing percentages.

IMPRESSIVE RESULTS

In 1953 sheep carried were 700 ewes plus rams and a few hoggets for killing, but by 1960 the numbers had increased to 1,040 ewes, 20 rams, and 30 hoggets. Cattle carried have also increased considerably, but the numbers have varied according to the feed available at different times of the year. Usually about 20 to 35 bought-in two- to three-year-old steers are wintered and in recent years 70 to 90 head have been carried through spring and summer. Many of the latter are grazers which are brought on to the farm for up to six months. All of the cattle including the grazers have been fattened.

Lambing percentages, taken on the number of ewes put to the ram, have usually been about 120. One season the percentage was 126, but in 1957 owing to ewes being shut up as a precaution against facial eczema, and again in 1959 through the purchase of infertile rams, percentages were down to 100.

Except for a disastrous season in 1958-59, all lambs have been fattened at satisfactory weights ranging from just under 30 lb in the first year to just over 38 lb in the peak year. Seasonal average weights have usually ranged from 33 to 36 lb. Overall lamb production has increased from just under 100 lb to over 150 lb per acre.

The 1958-59 season was a poor one generally for lamb production in the Manawatu and surrounding districts. An unfavourable spring, with a high incidence of internal parasites, was followed by 14 in. of rain in December and January. Losses on the farm in that season were diagnosed as being caused by parasites, pleurisy and pneumonia after shearing, lung worm, and probably selenium deficiency. Late that season a controlled selenium dosing and weighing trial was conducted with the Rongotea Veterinary Club and statistically significant responses were measured. It is probable that losses were due to a combination of causes and that most were directly attributable to adverse climatic conditions.

Average fleece weights have not been high owing partly to the policy of buying late-shorn five-year-old ewes and retaining ewes to a much older age than is usual in the district; some of the ewes have been kept for three years. Also the practice of stocking to capacity to finance development may have affected fleece weights. Wool weights, however, exclusive of lamb wool, have increased from 6.896 lb or 9½ lb per head in 1953-54 to 11.006 lb or 10½ lb per head in 1959-60.

Southdown rams have been used on Romney ewes except for the past two years, when a few Suffolk and South Suffolk rams have been used with good results. From March 1960 a number of selected ewes have been mated to Border Leicester rams, and the ewe lambs are to be kept for flock replacements. Ewes of this cross have produced a high percentage of lambs and have proved to be good milkers on a number of Manawatu farms where they have been tried.

Replacements will be bred on the farm in future and the flock will consist of 1,000 ewes and about 150 to 160 ewe hoggets. About 300 selected Romney ewes will be mated with Border Leicester rams and the remaining 700 crossbred ewes will be mated to Suffolk or South Suffolk rams. Any further increase in carrying capacity will be utilised by extra cattle bought as weaners or yearlings.

Buildings

The buildings consist of a house, implement shed, pump house, hay barn, sheepyards, and cattle yards, but there is no dip or shearing shed. However, shearing and dipping facilities have been made available by courtesy of a neighbour.

Labour

No permanent labour is employed, but cultivation work, haybaling, topdressing, shearing, and crutching are done by contractors. Docking is done on a cooperative basis between neighbours.

Equipment

With agricultural work being done by contractors capital outlay has been kept to a minimum and equipment has been restricted to those things which are used frequently, for example, grader blade, scoop, mower, and a tractor-mounted crate with removable sides.

Shelter

Little natural shelter is available and ideally two narrow belts of trees running north to south should be planted, one on the western boundary and the other down the centre of the farm. Preliminary work is being done to this end, but fencing and planting will require to be spread over many years.

GREAT POTENTIAL

The potential for increased production on much of the coastal sand country is probably greater than is realised even by the present occupiers. There are still large undeveloped areas, and many good moist flats that are at present covered in lupins, rushes, gorse, blackberry, and other noxious weeds could be improved quickly and cheaply by draining and ploughing. Also many of the consolidated inland dunes could support much better pastures if they were oversown and topdressed or giant disced and sown with a complete pasture mixture after a summer feed crop, as has been done successfully on several farms in the Levin district.

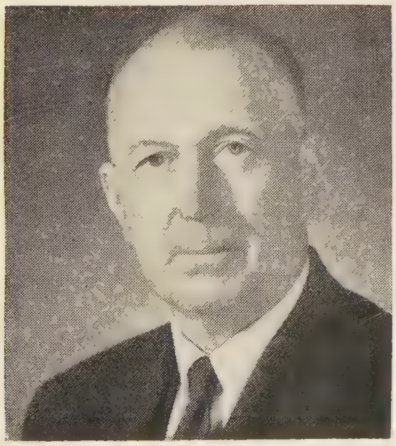
However, the semi-developed farms probably offer the greatest scope for improvement. Admittedly there are many well farmed properties, but there are many others that are capable of much higher production. Results on this property are largely due to careful planning of all farm operations combined with sound stock management and much hard work.

Mr T. L. HAYMAN SUCCEEDS LATE Mr GILLESPIE AS MINISTER of AGRICULTURE

IN the short period since his appointment to the portfolio of Agriculture in December last, Mr W. H. Gillespie, whose death occurred suddenly on 23 April, had shown remarkable energy and enthusiasm in getting to grips with current agricultural problems and developments. He made a point of having early discussions with representatives of producer organisations and had shown a keen practical interest in research and advisory services. With a background of a lifetime of farming and wide experience in many forms of public service, he expressed forthrightly on coming to office his determination to see that the enthusiasm and drive needed to maintain production increases were provided and that farmers, while having freedom individually in their business and collectively in their producer organisations, should also have the services they needed and the advice, cooperation, and help of Government when needed. All with whom he was associated will regret that his passing has terminated a service to agriculture that he had given unstintingly.

Mr T. L. Hayman, who has been appointed to succeed Mr Gillespie as Minister of Agriculture, is also a practical farmer with a wide knowledge of the industry and considerable experience of public work on local bodies and farmer organisations.

MR HAYMAN was born at Studholme in South Canterbury in 1904 and after leaving Waimate High School joined his father on his mixed farm and in agricultural contracting, which he still carries on in association with his two sons. In 1934 he was elected to the Wainono Drainage Board, of which he was later chairman; he has been deputy chairman of the South Canterbury Electric Power Board, held office in Federated Farmers and potato growers' organisations, and been active in the provision of rural water schemes in North Otago. He was first elected to Parliament in 1949 for Oamaru and on the abolition of this seat in 1957 became member for the Waitaki electorate. His farm is now in this electorate and he lives in Oamaru.



Mr Gillespie: A lifetime of unstinting service to agriculture.

Mr Hayman describes as a "challenging experience" his development of the 540-acre farm property at Studholme on what was originally a swamp in which losses of stock were high and on which they never thrived until knowledge of minor element deficiencies could be applied.

Mr Hayman, another practical farmer.

"The use of cobalt gave the first real success in our lamb fattening programme, but with home-bred lambs for fattening and replacement it still left something to be desired.

"In the last two years, following the advice of the Department of Agriculture and the special committee set up by Canterbury Agricultural College, we have undertaken selenium dosing and the experimental results have been outstanding."

In expressing his gratitude to the Department, Mr Hayman emphasised his conviction that there were many other farmers who could similarly benefit by availing themselves of the research findings and recommendations of the Department.

Mr Hayman's farm usually carries 1,400 sheep and 100 cattle, and the cropping programme is to have 30 acres in potatoes and 100 acres in wheat, with green crops for lamb fattening and swedes for winter feed.

A principle he had always pursued in his farming was to strive continually to increase the number of units of production and thus increase volume of production, said Mr Hayman.

"Though as an exporting country we are at the moment in some difficulty with over-production, it is my firm belief that with rapidly increasing world population every item of food and raw material for processing that New Zealand can produce will be required somewhere in the world in future. We may need to find a method of financing sale of our products to countries where there is a need for them but at present no power to buy, but our best insurance for the future is to continue to develop to the utmost our capacity and potential for production from the land."

Horticultural Diagnostic Laboratories Opened at Levin

NEW horticultural laboratories of the Department of Agriculture established at Levin early this year will serve as a diagnostic centre for the quarantine service of the Department and will be the headquarters for investigating plant pests and diseases that require detailed study as an aid to field officers who provide an advisory service to farmers and growers throughout New Zealand.

SCIENTIFIC officers from the Plant Quarantine Section in Wellington have been transferred to the new laboratories, where they will continue to specialise in the fields of entomology, plant pathology, horticultural botany, and the chemicals used in horticulture, as well as undertaking special field study of major problems requiring the facilities and specialist staff at Levin. The laboratories, with their first-class facilities and equipment, will be a valuable strengthening of the present service of horticultural disease and pest control, and are expected to play a particularly important part if any new plant pest or disease is identified in the country and an eradication programme is undertaken.

Provision has been made for a staff of two entomologists, two plant pathologists, an officer specialising in plant therapeutants, a botanist for research into ornamentals, an entomologist to specialise on insect pests of pastures, with an entomologist in charge of the group.

The bulk of the routine work of the laboratories will be identification and diagnosis of pests and diseases intercepted by quarantine officers at points of entry to the country or discovered subsequently on imported material being grown under quarantine.

Under the present regulations plant material in the category "prohibited" can be brought into the country only with the permission of the Department of Agriculture and must go to the Plant Diseases Division of the Department of Scientific and Industrial Research in Auckland for the period of quarantine. Material in the category "restricted" is quarantined on the importer's property where it is subject to continuous inspection by Departmental officers and specimens of any pest or disease becoming evident during that quarantine are sent to Levin for examination.

Specimens coming to Levin for study, from material under quarantine or from field officers with problems in their districts, may range from leaves and fruit to butts of trees.

A prime factor influencing the establishment of the new laboratories at Levin was the proximity of the Department's Horticultural Research Station in Kimberley Road, which will enable close association between the technical and research staff of the two institutions, with resultant improved service to field advisory officers and so in turn to horticultural producers. Present staff at the laboratories will necessitate assistance in field work to be confined mainly to officers in the Palmerston North, Levin, and Wellington areas, but it is envisaged that special field studies will be undertaken anywhere if the magnitude of the problem warrants it. One of the laboratory staff has already made intensive local inquiry into the condition called "pink eye" that caused large losses of pears for canning and export in Hawke's Bay this season.

An entomologist at the new laboratory checks during identification of an insect specimen.

Dr L. R. Wallace Now Assistant Director of Ruakura

DR L. R. WALLACE, widely known for his work on animal nutrition, has been appointed Assistant Director of the Department of Agriculture's Ruakura Animal Research Station. Aged 43, Dr Wallace has been a senior member of the staff at the station since he joined it in 1946.

Dr Wallace, who obtained his B.Agr.Sc. degree from Massey Agricultural College in 1939 and M.Agr.Sc. degree with first-class honours in animal husbandry in 1940, joined the Navy in 1941. However, toward the end of that year he was seconded at the request of the British Agricultural Council to Dr John Hammond at the Institute of Animal Nutrition, School of Agriculture, Cambridge, to assist with research for the British Ministry of Food.

He was awarded a Doctorate of Philosophy by Cambridge University in 1946 and returned to New Zealand later that year to take up the position of Chief Nutrition Officer at Ruakura.

Dr Wallace.

◆

New Superintendent of Grading in Dairy Division

MR W. F. B. CONNELL, Senior Assistant Inspector of Dairy Products, London, has been appointed Superintendent of Grading in the Dairy Division of the Department of Agriculture. He succeeds Mr N. E. Briggs, who was recently appointed Assistant Director of the Dairy Division.

Born in Northern Ireland and educated there, Mr Connell came to New Zealand in 1926. He worked on dairy farms for two years and for the next 10 years in cheese factories. In 1938 he became manager of the Bidwill Dairy Company, Featherston. He left this position in 1945 to become Dairy Instructor and Grader in the Department of Agriculture at Auckland. In 1949 he was transferred to Wellington and in 1951 to Dunedin.

Mr Connell became Senior Assistant Inspector of Dairy Products, London, in 1957.

◆

The Case FOR and AGAINST Dairy Farm Runoffs

RUNOFFS, because they ease some of the problems of the dairy farmer whose home farm is wet in winter, may be too easily regarded as inevitably a good proposition. That some of them may not be and may not even pay their way is suggested in this article by G. J. BATTEN, Farm Advisory Officer, Department of Agriculture, Thames. He recommends farmers to examine advantages and disadvantages of runoffs as an aid to improved farm conditions and returns and suggests possible alternatives to overcome problems which arise where land lies wet in winter.

THE dairy farmer on heavy land should always consider the advantages and disadvantages of a runoff as a means of escaping winter mud and improving the management and production of his farm. Winter is a critical time for both milking cows and pastures, and winter dairy farm management can have a marked effect on income.

The level of feeding during winter is known to influence the cow's production in the following season a great deal. Butterfat increases of up to 50 lb per cow have been obtained with better feeding. As a cow cannot eat enough grass during spring, she has to draw on body reserves. If a cow has been wintered poorly, her body reserves are inadequate to sustain full production.

Winter pasture management is important because stock and grazing management then will determine the grass : clover : weed balance in the following season.

- Leniently grazed pastures tend to become grass dominant, and undesirable species such as Yorkshire fog are encouraged.
- Closely grazed pastures promote clover dominance, and bloat may then become a problem.
- On wet soils excessive stocking during winter facilitates the ingress of weed grasses and weeds such as pennyroyal into pastures.

With good winter management it should be possible to have cows calving in good condition on a well balanced, weed-free pasture, but desirable stock and pasture management may not be attainable on wet, heavy, meadow soils owing to the physical structure of the soil under prolonged winter rainfall. In an endeavour to have their cows in good condition at calving and pastures in good order many farmers on heavy soils have used runoffs. However, the management and cost which these entail should be examined closely; a runoff can be uneconomic or unnecessary.

Here is the case for and against a runoff.

FOR

The runoff principle entails the removal of most of the stock from the home farm to another area for the wet period, usually from about the beginning of June until just before or after calving. A runoff in effect becomes another farm, and usually stock numbers can be increased because of the larger area available. Increased stock numbers can be beneficial in several ways apart from the higher direct returns that should result.

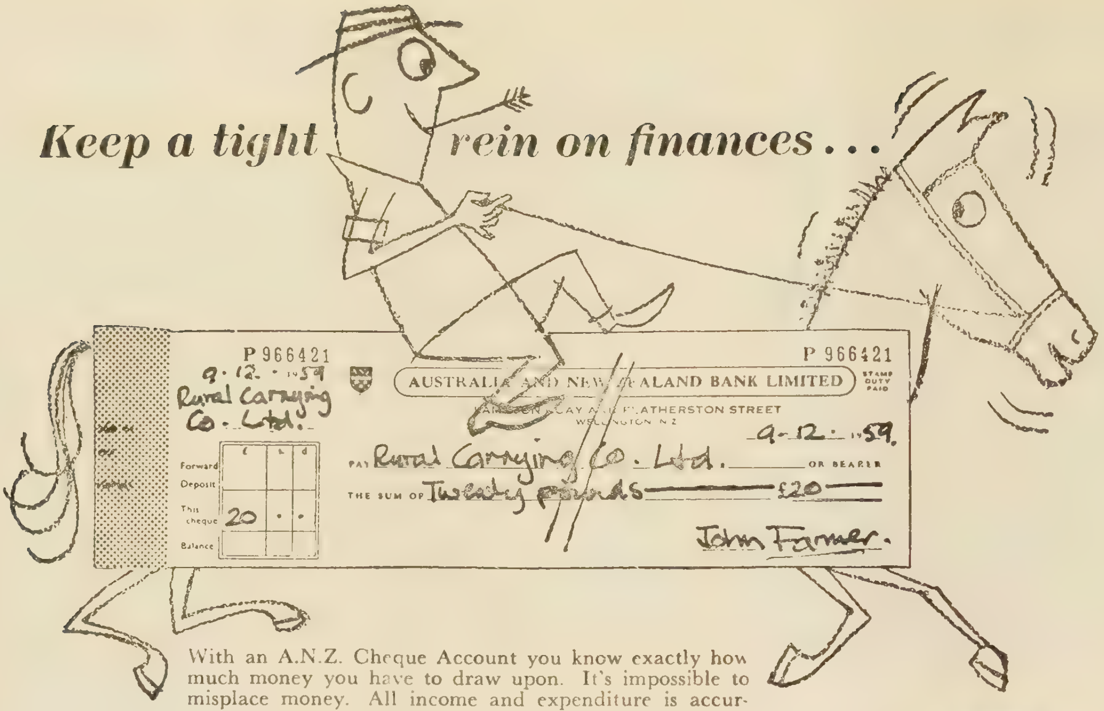
A farmer who is about to tuberculin test his herd under the voluntary scheme introduced in 1958 can rear extra heifers on a runoff to replace any Tb reactor cows. The big expense facing a farmer with reactors can be overcome with known replacement stock that are usually cheaper than comparable bought-in stock.

A new farmer using herd testing as a guide for culling the least profitable cows and keeping a large number of A.I. bred heifer calves on a runoff can quickly improve the quality and potential of his herd.

A runoff enables more cows to be milked on the home farm, as it is virtually ungrazed for two months and all young stock are on the runoff for the greater part of the year. This may mean the difference between an economic and an uneconomic home property.

The production of cows is lowered if they are in poor condition at calving. Early calving may be a disadvantage for herds on wet soils.

Keep a tight rein on finances . . .



P 966421
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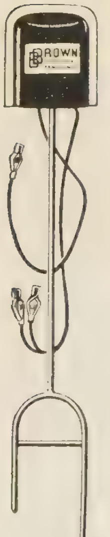

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Pasture Damage

Shifting stock to a runoff reduces poaching and pasture damage, and ingress of weeds is thus kept to a minimum. Poached areas make excellent seedbeds for spring-germinating seeds of pennyroyal, docks, and buttercup, and undesirable grasses such as creeping bent, tall fescue, and *Poa trivialis*.

The need for late winter-spring pasture spraying for weed control is also reduced. At times it is impossible to boom spray at the correct time of the year on these heavy, wet soils, so elimination of poaching overcomes this problem at least partially as well as reducing expenditure on weed control chemicals.

Further expenditure can be saved, as pastures which are not poached do not have to be repaired by rolling or levelling in spring and perhaps resowing in autumn.

Reduction of poaching leads to quicker growth in spring, and this can be a big advantage to the milking herd if spring growth is late

Stock

Stock taken to a runoff for winter may benefit from the change of country. They will certainly benefit from the change of soil conditions—out of the mud on to the usually drier ground where they can feed and sleep in comfort. On a good runoff saved pasture is usually available. Similar pasture on the home farm could not be fed off without some of it being wastefully tramped into the mud. A herd wintered on saved pasture and good hay will return to the farm in much better condition than if they had stayed at home in the wet.

Good wintering has a marked effect on the season's production and a runoff usually enables cows to be well wintered.

Poaching upsets pasture balance and favours invasion of weeds and weed grasses.

Grazing out

A modification of the runoff system which is very attractive to farmers on wet country is grazing out the herd during winter at a price per head. There are no capital outlays for the runoff property, buildings, and improvements, no maintenance expenditure, no rates, and no worries associated with an extra property. Yet the herd is off the farm for the winter and all the runoff advantages still apply. Grazing costs of up to £2 per head for the winter are cheap if the grazing is good and if it is permanent.

* * *

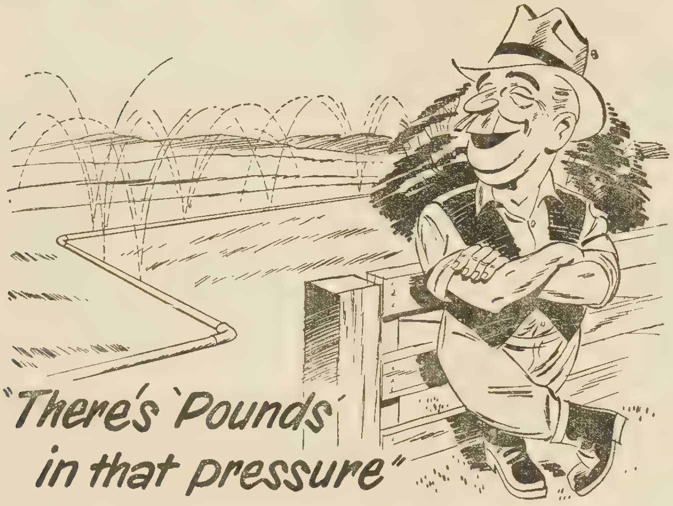
A farmer owns a runoff to escape the mud on his winter-wet home farm. Even if runoff conditions are not ideal for good wintering, the opportunity of getting the herd out of the mud for two months is well worth the cost.

Gateways especially and pastures are easily bogged up by stock during winter.

AGAINST

The runoff must be **farmed** to be economic. Though many farmers use their runoffs just as places to put the herd during winter, the high costs associated with a runoff result in very expensive, uneconomic, wintering

DAD and DAVIES ON THE FARM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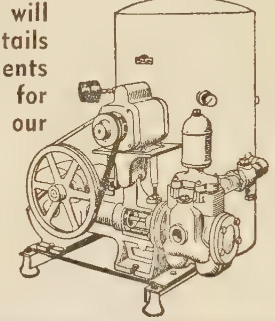
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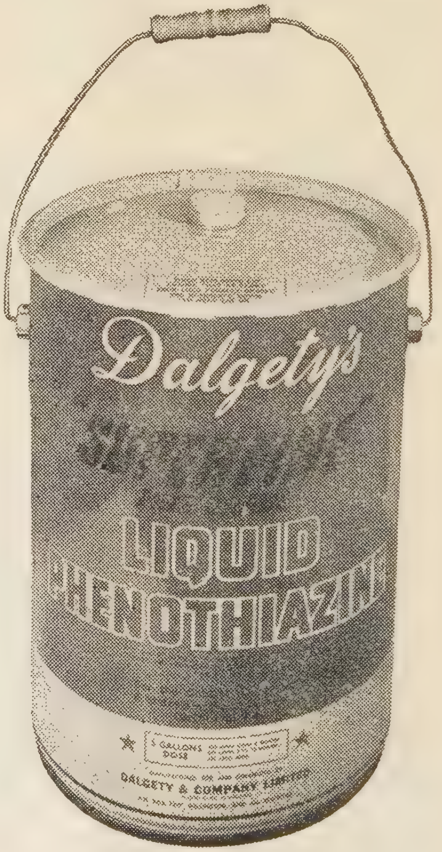


Grazing Management

Many runoffs are a tangled mass of blackberry and rank paspalum and other grasses when the cows arrive for the winter. As there are usually insufficient of the right class of stock to handle the pasture growth during spring and summer, this is unavoidable. Control of fern, tauhinu, ragwort, and blackberry and gorse by mechanical means is not possible on many runoffs because they are too steep or broken and chemical control is not always satisfactory.

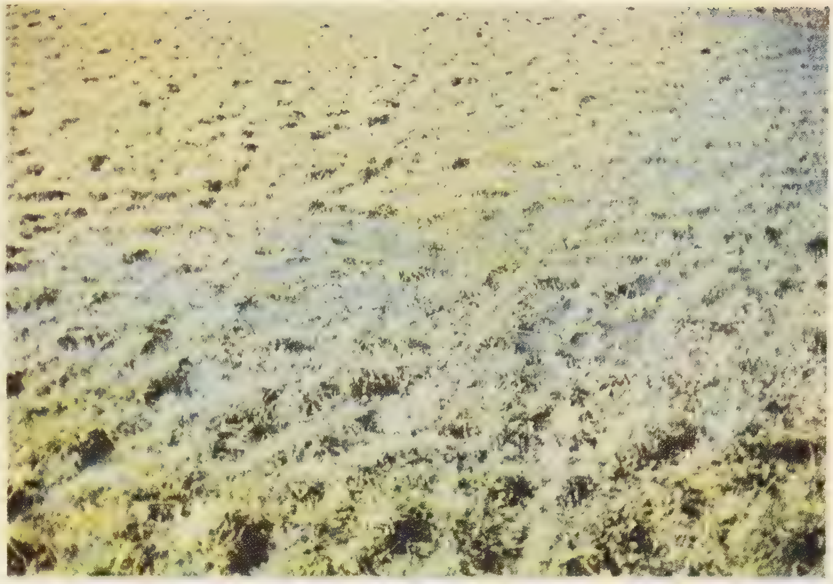
Not only is the runoff frequently improperly stocked, but pasture management on the home farm too is often poor, because the yearlings are not on the home farm to assist in controlling the feed. Excessive topping may be necessary. Then during winter, when the herd too is away, inadequate grazing allows winter-growing pasture species such as Yorkshire fog and *Poa trivialis* to become dominant; desirable species are smothered out and production suffers.

Poaching

Though the herd is on the runoff for six weeks and poaching of the home farm is reduced, on many farms herds calve during the wettest time of the year, from mid July onward. Even with an average spring the farm is still poached and as a result pasture is damaged. The runoff can help, but does not always result in attainment of the desirable objects intended.

★ ★ ★

A survey has shown that often a runoff does not increase butterfat production. This indicates either that cows do not calve in any better condition or that cow numbers are not increased with the increased area, or both. The main benefit therefore could be only in the reduction of pasture damage.



Stock must be removed from areas where soils are relatively impervious to water, as poaching is worse when there is surface water lying on paddocks.

Cows **can** be wintered at home on a winter-wet farm. With adequately drained paddocks the herd can be spread over the farm for the early part of winter with a few cows in each paddock. For the periods when the farm becomes too wet a proportion of the herd can be fed from hay-racks on a sheltered area of concrete, sawdust, or road metal. However, in excessively wet winters stock numbers may have to be reduced if pasture damage is to be minimised.

Though stock numbers, and therefore production, will not be increased, as there is no increase in the farm area, there will be no runoff costs. Yet the cows will be well wintered and pasture damage will be reduced to a minimum.

Though the grazing-out system is an ideal way of wintering off the herd, suitable grazing under a secure tenure can seldom be obtained. A farmer who depended on grazing that could suddenly become unavailable would be taking a serious risk.

Conclusions

Four choices are open to the dairy farmer who farms winter-wet country.

Expenditure

	£
Transport:	
Hay, 1,300 bales @ 6d. each, to runoff .. approx.	32
Stock, 65 cows @ 6s. per head to runoff, cows driven back to farm .. .. approx.	20
Farmer, by car every day, 16 miles x 50 days, 800 miles @ 9d. per mile	30
Time: 2 hours per day for 50 days @ 6s. per hour = £30. Half this cost is allowable for the extra time involved in feeding out	15
Rates: 6d. per £ unimproved value, 30 acres @ £20 = £600 ..	15
Interest: 30 acres @ £60 per acre capital value = £1,800, 5 per cent on £1,000 loan = £50 and 5 per cent on £800 own capital = £40	90
Repairs and maintenance: Tracks, fences, buildings, etc. ..	10
Depreciation:	
Fences, £100 @ 5 per cent	5
Hay barn, £200 @ 3 per cent	6
Topdressing: 30 acres @ £1 10s. per acre spread	45
	268

Income

GOOD RUNOFF

If the runoff is good, there will be income from extra stock carried:

	£
8 extra heifers run, and sold in calf at £15 each over and above rearing costs	120
5 extra cows milked @ 270 lb butterfat = 1,350 lb	
Extra production from herd because of better wintering than on home farm: 70 cows @ 20 lb butterfat each = 1,400 lb.	
Total extra butterfat, 2,750 lb @ 3s per lb ..	412
	532

Therefore a good runoff is worth £264 **extra** to the farm.

POOR RUNOFF

If the runoff is poor, no extra stock can be carried on it during summer, so there will be no extra income from stock sales. Cows will be as poorly wintered as on the home farm, so there will be **no increased production per cow.**

	£
However **5 extra cows** can be milked @ 270 lb = 1,350 lb @ 3s. per lb approx.	202
Extra costs are: Chemicals for weed control on runoff (because runoff is poor and there are no stock to control weed growth) ..	15
	187

The net **loss** for having a poor runoff is £81.

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1. Modified Zero Grazing

Renewed interest has been taken in zero grazing in U.S.A. and Europe since improved mechanical harvesting and handling equipment became available. Simply, it involves cutting and carting the feed to the cow instead of making the cow harvest the crop, the general practice in New Zealand. In both systems of feeding surplus grass is conserved as hay and silage.

Pasture damage would be reduced by the adoption of zero grazing for wintering because there is no treading and poaching on wet soils, and muddy conditions are eliminated. Less feed is required because there is no waste and housed animals require less for maintenance. The system is used to a limited extent with winter milking of town supply herds in the South Island.

However, if the ground is too wet for cows to graze, it may be also too wet for tractors and machinery to harvest the grass and transport it to the herd. Therefore the zero system does not fully overcome the farmer's problem unless there is sufficient hay and silage for the herd to be fed on these alone when the ground is too wet for machinery.

2. No Runoff; Wintering on Farm

Some farmers use a runoff in association with farms which are not wet enough during winter to warrant such expenditure. With improved management they could do without the runoffs and still farm enjoyably and profitably with little pasture damage.

On many farms runoff costs are high and returns uneconomic. Some farms can be wet enough to benefit from having the cows off in winter, yet poor spring management cancels out the advantage. To these farmers a runoff is a handicap, too, and net returns would be better if the herd remained on the home farm throughout the year.

3. Runoff

A runoff can be justified only if it is necessary for satisfactory management of the home farm and it pays its way. It must be farmed. The pasture it provides must winter the herd properly so that cows calve in good condition. Even a good runoff is only part of the answer in eliminating mud on the home farm; correct management must still be adopted there to ensure that the advantage which can be derived from spelling by use of the runoff is not lost.

Too often winter feed on the runoff is poorer, as it is on this hillside, than on the home farm.

4. Grazing out

Grazing the herd out is a modification of the runoff and has similar limitations. The grazing must be good and it must be permanent.

Wintering dairy herds on winter-wet meadow soils is a problem which can be solved only by the application of commonsense methods which result in economically wintered cows calving on undamaged pastures. No doubt there are some extremely wet farms from which the stock must be wintered off, but equally there are farms which winter the stock off and yet receive no benefit directly or indirectly.

Book Review

"Sheep-O! The Story of the World's Fastest Shearers": A. R. Mills

MR MILLS knows his subject from all angles, having shorn many thousands of sheep himself, besides farming on his own account for many years. Long association with the Bowen brothers, particularly Ivan and Godfrey, the past and present record holders, gave him a unique advantage in writing this book.

With Ivan or Godfrey he has visited nearly every district in New Zealand, organising shearing demonstrations, contests, and record attempts. He had much to do with the early organising of the New Zealand Wool Board's shearing tuition service, and though now retired, he has maintained his keen interest in everything pertaining to shearing.

Mr Mills in his book has placed in perspective the many attempts on shearing records both here and in Australia. There have been many arguments about records, and probably will be until the conditions are strictly comparable. The author makes a convincing case for a standard set of rules, and compares the merits of past contenders, making allowance for different conditions.

He has unearthed many intriguing tales of shearing rivalry, station life in the early days both here and in Australia, and many amusing incidents that enlivened rural life before the days of radios and motorcars.

The book contains 32 pages of photographs gleaned from many sources. Some are historical, but there are modern ones too, right up to Godfrey Bowen's 559 tally in Wales a few months ago. A series of 14 shots shows Ivan Bowen demonstrating his shearing technique step by step, and other photographs give a cross section of our great wool-growing industry. This book should interest all New Zealanders and many others beyond our shores, particularly Australians.

—*J.E.D.*

A. H. and A. W. Reed, Wellington. 25s.

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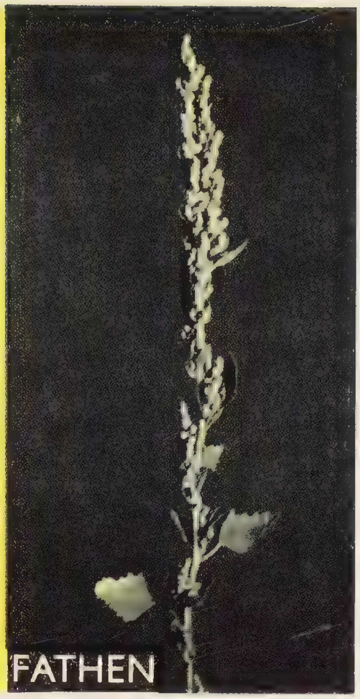
Weed Identification and Control

This is one of a series of articles illustrated in colour to appear in the "Journal" from time to time in which identification and control of various weeds will be discussed.



By L. J. MATTHEWS,
Principal Scientific Officer,
Department of Agriculture,
Wellington

FATHEN (*Chenopodium album*) belongs to the family (*Chenopodiaceae*), the goose-foot family (Greek, chen, a goose, and pous, a foot, so called because the leaves are shaped like a goose's foot).

FATHEN is an annual; the flowers are green; stems are erect, branched, and ribbed. Leaves are stalked rhomboidal or ovate, irregularly toothed, and the upper leaves are lance shaped and mealy below. The flowers are in small clusters in axillary and terminal spikes.

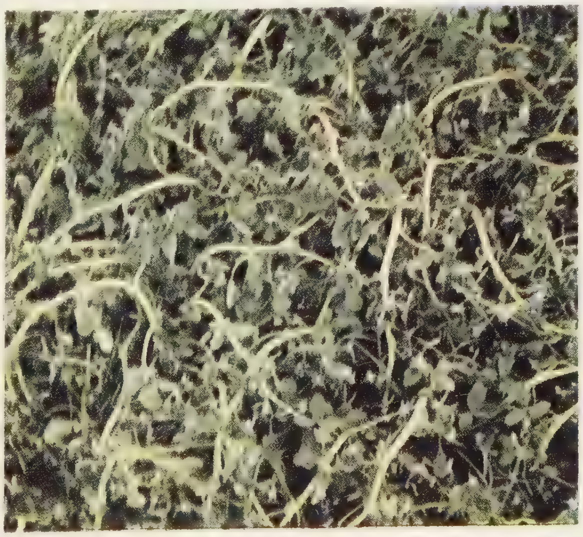
Fathen is a sub-cosmopolitan species of the warmer areas and used to be eaten as a green before the development of spinach. Two other species which are of local importance in New Zealand are *C. pumilio*, which is glandular and has a strong smell and *C. murale*, which is not glandular and the leaves of which are not mealy-white as in fathen.

Why is Fathen a Weed?

Fathen is a very common weed in any cultivated areas. It competes strongly with crops for moisture and nutrients. It is a prolific seeder and the seeds remain viable for a long time. The production of dormant seed enhances its chances of survival. Seeds germinate over a long period, so that repeated control measures are required to kill consecutive crops of germinating seedlings.

Fathen competes strongly with all slowly establishing crops; lucerne, peas, carrots, onions, and fodder beet are some of the crops that suffer the most severe competition. New pastures, cereals, and brassicas are not affected to the same extent. Even with these crops, one established fathen plant per square foot offers severe competition, particularly to the germinating crop.

High density establishment is possible in most cultivated soils, as weed seed populations can reach astronomical figures of a hundred million seeds to the acre.


Fathen control in new pasture with MCPB without clover damage.

Control

Seedling plants of fathen are surprisingly susceptible to MCPB and 2,4-DB, and adequate control of fathen can be obtained in crops where these materials can be used at rates of 1 to 1½ lb acid equivalent per acre. In young pastures MCPB or 2,4-DB should be used as soon as there is complete ground cover of pasture species and weeds. In lucerne 2,4-DB should be applied as soon as the lucerne has reached the one- to two-trifoliate leaf stage.

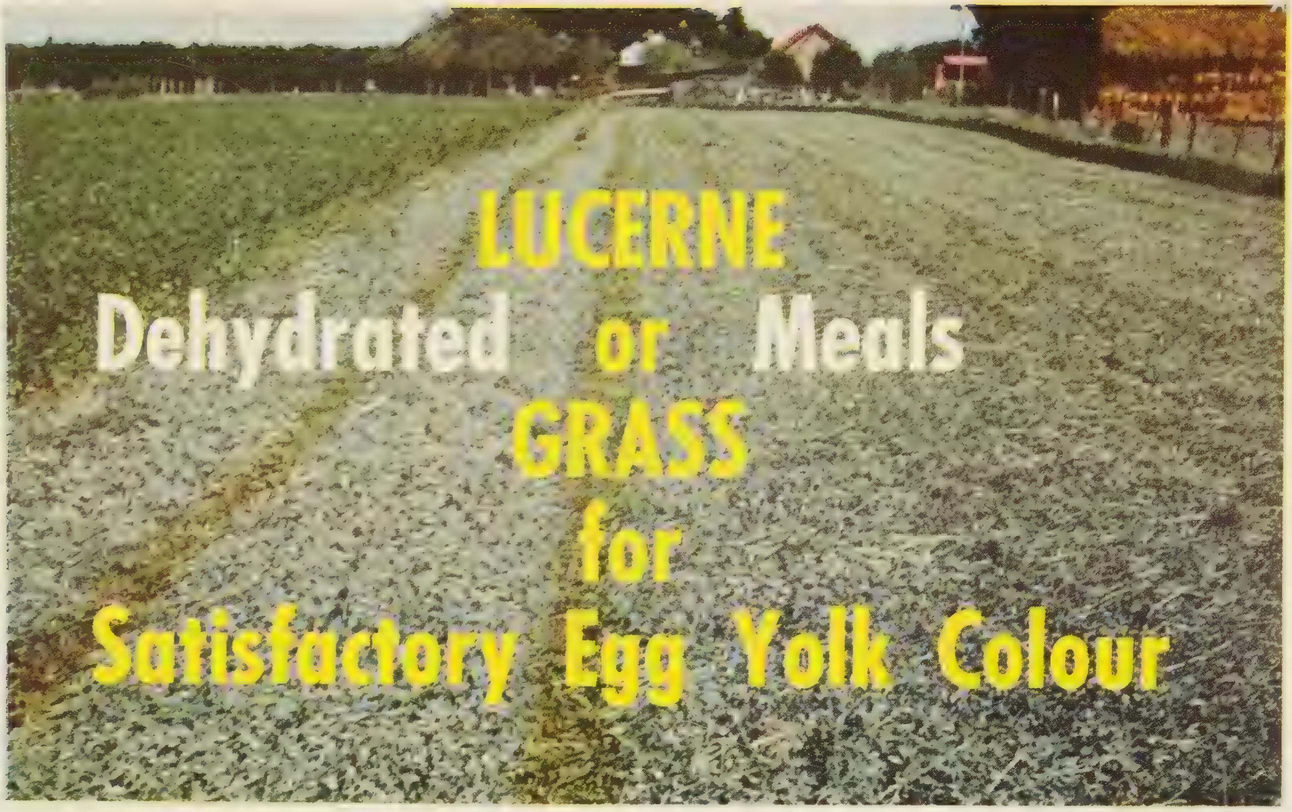
Fathen in wheat and barley may be controlled either by MCPB applied after the one-leaf stage or by MCPA at 1 lb acid equivalent per acre after the six-leaf stage. For oats MCPA may be applied after the one-leaf stage, so that there is little advantage in using MCPB.

Fathen is also highly susceptible to mecoprop and this preparation may be used in cereals at the same growth stages as for MCPA if other weeds are present that dictate its use. If so, mecoprop should be used at 2 lb acid equivalent per acre. Fathen in peas may be controlled with either MCPB or dinoseb, the latter material being used at 1 to 2 lb per acre according to conditions.

Fathen is still a serious problem in field brassicas. It is highly resistant to MCA (sodium monochloroacetate), and sufficient CIPC or CDEC cannot be used, particularly in northern crops, to obtain control of consecutive crops of germinating fathen. CIPC is similarly ineffective in onions and carrots. The first strike of fathen seed appears to remove all the CIPC, CDAA, CDEC, etc., from the soil, allowing subsequent strikes to grow unimpeded.

In maize simazine and atrazine probably persist long enough to cope with subsequent germination. This is also true for diuron or simazine in asparagus, grapes, and nursery stock.

Perhaps the most difficult crop to weed is fodder beet, which is a member of the *Chenopodiaceae*, and to date it has been very difficult or impossible to control a weed in a closely related crop.



Dehydrated LUCERNE or GRASS Meals for Satisfactory Egg Yolk Colour

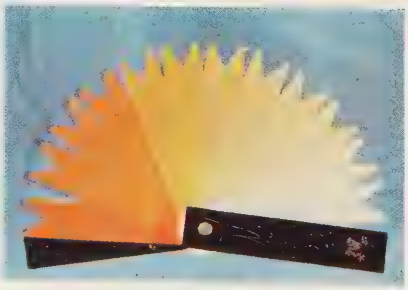
THOUGH of no better value nutritionally, a reasonably pigmented egg yolk has greater customer appeal than a pale yolk. Consumer demand is for eggs with good yolk colour, and eggs with poorly pigmented yolks on the market can detrimentally influence sales. Yolk colour is determined by the laying bird's diet and in the course of metabolism, pigments, usually in the form of xanthophylls, are extracted from the food and transferred to the yolk before its release from the ovary.

By J. EDMONDSON,
Poultry Experimentalist,
Department of Agriculture,
Upper Hutt

LAYING birds allowed to run outside with access to grass and other green foods invariably produce well pigmented yolks. Under intensive conditions, where birds are kept inside, foods rich in natural pigments are used to supplement the diet and perform a similar function. The two most commonly used products in New Zealand are dehydrated lucerne meal and maize meal. Interest is also being shown in the manufacture of grass meal for this purpose. Other ingredients normally included in a layer's ration are low in natural pigment and contribute little or nothing to yolk colour. Evidence indicates that some products such as meat meal, fish meal, and soya bean oil meal may contain a factor or factors which inhibit the deposition of pigment.

The trial at the Department of Agriculture's Poultry Demonstration Plant reported here was designed to test:

(a) The effect on yolk colour of various levels of a good quality dehydrated lucerne meal.



The indicator used to measure yolk colour has a range from off white to deep orange.

Levels exceeding those known to be necessary for satisfactory yolk colour were incorporated to check a claim that the use of lucerne meal caused laying birds to scour.

(b) A sample of dehydrated grass meal at present available on the market in limited quantities but the production of which is likely to increase. This was tested at similar levels to those of dehydrated lucerne meal.

(c) The effect on yolk colour of a proprietary product, a stable preparation of a carotenoid (B-apo-8-carotenal) for which claims have been made that it imparts yolk colour.

First Feeding Test

Method

From 24 May 1960, White Leghorn x Australorp crossbred pullets in full lay and housed in single-bird laying cages were fed a low pigment basic mash. Samples of eggs were inspected at intervals and when it was established that yolk colour had been reduced to a minimum the feeding of test rations began. The number of birds per group and the type of test ration fed are shown in the table at the bottom of page 527.

DEHYDRATED LUCERNE AND GRASS MEALS FOR BETTER EGG YOLK COLOUR

The amounts of carotenoid pigment used in groups 9 and 10 are those recommended by the manufacturers as being satisfactory for pigmentation and economical.

The formula of the basic low pigment diet (in parts by weight) is:

Bran	4
Coarse ground wheat	50
Barley meal	25
Meat meal	12
Milk powder	4
Oyster shell dust ..	2½
Salt	½
Vitamin premix ..	2

Manganese sulphate is added at 4 oz to the ton.

The vitamin premix supplied 4,000 international units of vitamin A and 400 international chick units of vitamin D_3 per pound of diet.

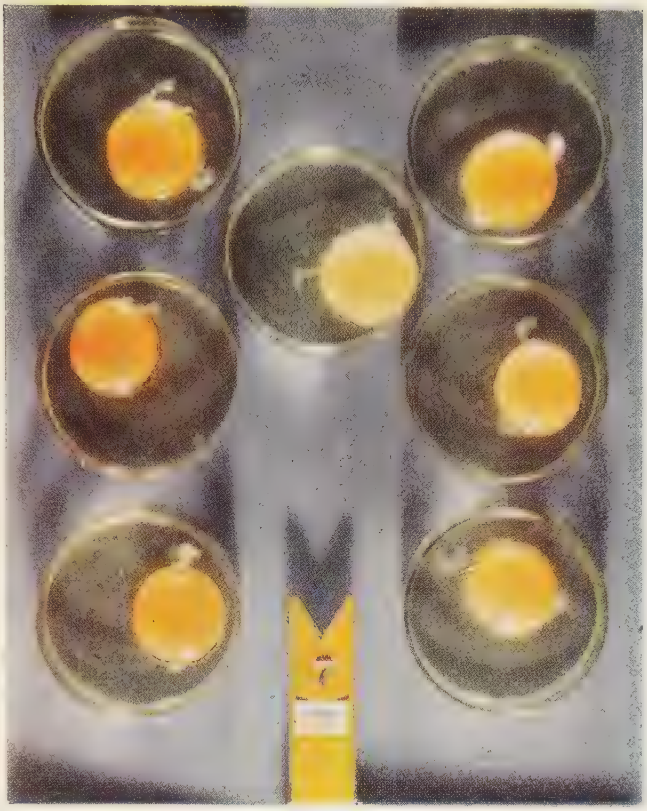
The diet was fed as dry mash ad lib. and limestone and hard grit were freely available. Sufficient food was mixed to supply each group of birds for four to five weeks and was held in covered metal drums.

Samples of eggs from each group were examined on Mondays, Wednesdays, and Fridays, the first samples being taken three days after feeding of the test rations started. The examination comprised breaking out of the eggs into glass dishes placed on white paper and comparisons made in natural daylight. Comparisons were made between groups and also against a colour fan supplied by the manufacturers of the carotenoid pigment, thereby making it possible to establish a series of numbers to indicate the degree of pigmentation. The fan consisted of 12 shades ranging from pale yellow to deep orange. From four to six eggs were opened from each sample and an average of these was used to plot a graph.

Results

The graphs on page 529 indicate the time required to achieve maximum pigmentation and also the degree of pigmentation obtained from the different test rations. The broad horizontal straight line on each graph represents the minimum pigmentation considered desirable by the New Zealand Egg Marketing Authority for the New Zealand market.

In tests of customer preference eggs were displayed before representative groups of people. Eggs from the groups receiving 4 per cent, 6 per cent, and 8 per cent of lucerne meal and grass meal were preferred, but those from diets with 2 per cent of grass meal and lucerne meal and 3 p.p.m. of carotenoid pigment came close to the range of acceptability, particularly if eggs from the higher levels of lucerne meal and grass meal were removed and comparison was made only with eggs from the negative control (basic low-pigment diet). The yolk colour of the 1.5 p.p.m. group was not so acceptable.



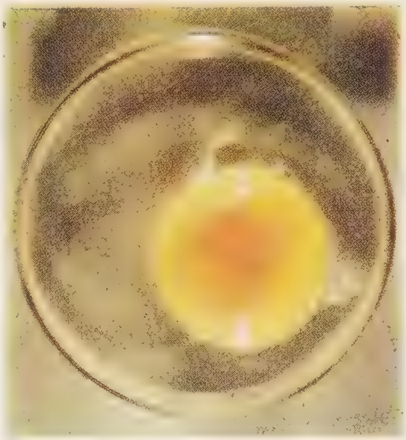
A comparison of egg yolk colours; the yolks on the left are from birds fed a ration containing 4 per cent of dehydrated lucerne meal, and those on the right from birds on a ration containing 4 per cent of dehydrated grass meal. The pale yolk in the centre is from a bird in the negative control group. The yolk colours can be compared with the New Zealand Egg Marketing Authority's standard colour on the indicator at the bottom of the illustration.

Yolk of an egg from a bird which for three weeks has received mash without any food containing the pigment which colours yolks.

FIRST FEEDING TEST

Group	Birds	Ration
		Basic low pigment mash +
1	8	2 per cent lucerne meal
2	8	6 per cent lucerne meal
3	8	8 per cent lucerne meal
4	8	2 per cent grass meal
5	8	4 per cent grass meal
6	8	6 per cent grass meal
7	8	8 per cent grass meal
8	20	4 per cent lucerne meal (positive control)*
9	20	1.5 p.p.m. (carotenoid pigment)
10	20	3.0 p.p.m. (carotenoid pigment)
11	20	Basic low pigment mash only (negative control)

* Known to produce satisfactory yolk colour



Yolk of an egg from a bird receiving 4 per cent of dehydrated lucerne meal in its rations. The colour is slightly deeper than the minimum colour required by the New Zealand Egg Marketing Authority.

Clip this chart out for future reference

TVL GUIDE TO VACCINATION

against blood poisoning & pulpy kidney

AGE OF SHEEP AFFECTED	CAUSE OF DEATH (Previous Season)	TIME LOSSES OCCURRED (Previous Season)	WHEN TO VACCINATE	TVL VACCINE TO USE	DOSE	REMARKS
LAMBS (UP TO 8 WEEKS OF AGE)	NAVEL ILL	BIRTH TO 7 DAYS	VACCINATE EWE 2-4 WEEKS BEFORE LAMBING	BLACKLEG-MALIGNANT OEDEMA	5 c.c	
	BLOOD POISONING	MARKING/DOCKING	VACCINATE EWE 2-4 WEEKS BEFORE LAMBING	BLACKLEG, OR BLACKLEG-MALIGNANT OEDEMA	5 c.c. 5 c.c.	USE THE COMBINED VACCINE IF MIXED INFECTION IS SUSPECTED.
	PULPY KIDNEY	FROM 1ST WEEK TO 8 WEEKS	VACCINATE EWE AT TUPPING AND AGAIN PRE-LAMBING. (IF EWE DONE PREVIOUS YEAR OR AS LAMB, ONLY PRE-LAMBING VACCINATION IS REQUIRED.)	PULPY KIDNEY, OR PULPY KIDNEY-BLACKLEG OR TRIPLE	2 c.c. 5 c.c. 5 c.c.	USE A COMBINED VACCINE AT PRE-LAMBING TO PROTECT AGAINST BLOOD POISONING ALSO.
LAMBS (8 WEEKS OF AGE ONWARDS)	BLOOD POISONING	DOCKING ONWARDS/ LAMB SHEARING	VACCINATE LAMB 14 DAYS BEFORE DANGER PERIOD.	BLACKLEG, OR BLACKLEG-MALIGNANT OEDEMA	5 c.c. 5 c.c.	USE THE COMBINED VACCINE IF MIXED INFECTION IS SUSPECTED.
	PULPY KIDNEY	FROM 8 WEEKS ONWARDS	VACCINATE LAMB AT DOCKING: REPEAT 3-4 WEEKS LATER.	PULPY KIDNEY	2 c.c	
HOGGETS	BLOOD POISONING	ON WINTER CROPS	AT LEAST 2 WEEKS BEFORE PUTTING ON WINTER CROPS. RE-VACCINATION AS TWO-TOOTHS WILL GIVE LIFE-LONG PROTECTION.	BLACKLEG, OR BLACKLEG-MALIGNANT OEDEMA	5 c.c. 5 c.c.	USE BLACKLEG-MALIGNANT OEDEMA VACCINE IF MIXED BLOOD POISONING INFECTION IS SUSPECTED.
	PULPY KIDNEY	ON WINTER CROPS	AT LEAST 2 WEEKS BEFORE PUTTING ON WINTER CROPS.	PULPY KIDNEY, OR TRIPLE	2 c.c. 5 c.c.	USE TRIPLE VACCINE IF BLOOD POISONING AND PULPY KIDNEY ARE TO BE PREVENTED.
EWES	BLOOD POISONING	LAMBING, SHEARING, DIPPING	AT CONVENIENT TIME AT LEAST 14 DAYS BEFORE DANGER PERIOD.	BLACKLEG, OR BLACKLEG-MALIGNANT OEDEMA	5 c.c. 5 c.c.	USE THE COMBINED VACCINE IF MIXED INFECTION IS SUSPECTED.
	BLACK DISEASE	JANUARY-APRIL	NOVEMBER-JANUARY OR AT LEAST ONE MONTH BEFORE EXPECTED ONSET OF DISEASE. A SECOND VACCINATION THE FOLLOWING YEAR WILL GIVE LIFE-LONG PROTECTION.	BLACK DISEASE	2 c.c.	THE DISEASE USUALLY OCCURS IN WELL-CONDITIONED 2-4 YEAR-OLD SHEEP.

VETERINARY ADVICE SHOULD BE SOUGHT IN ALL CASES WHERE AN ACCURATE DIAGNOSIS OF DISEASE HAS NOT BEEN ESTABLISHED

TVL SINGLE VACCINES

protect against

PULPY KIDNEY
BLACKLEG
MALIGNANT OEDEMA
BLACK DISEASE

TVL COMBINED VACCINES

protect against

PULPY KIDNEY-BLACKLEG
PULPY KIDNEY-MALIGNANT OEDEMA
BLACKLEG-MALIGNANT OEDEMA
BLACKLEG-MALIGNANT OEDEMA -PULPY KIDNEY (TRIPLE)

TASMAN VACCINE LABORATORY LIMITED P.O. BOX 29 UPPER HUTT

and the negative control eggs were rejected without hesitation.

No Indication of Scouring

There was no indication of scouring among any of the groups on test rations and there seemed to be a tendency to greater firmness of droppings from birds fed the higher levels of lucerne meal and grass meal.

Some producers have stated that they consider lucerne meal when fed in a mash to laying birds will loosen droppings.

Second Feeding Test

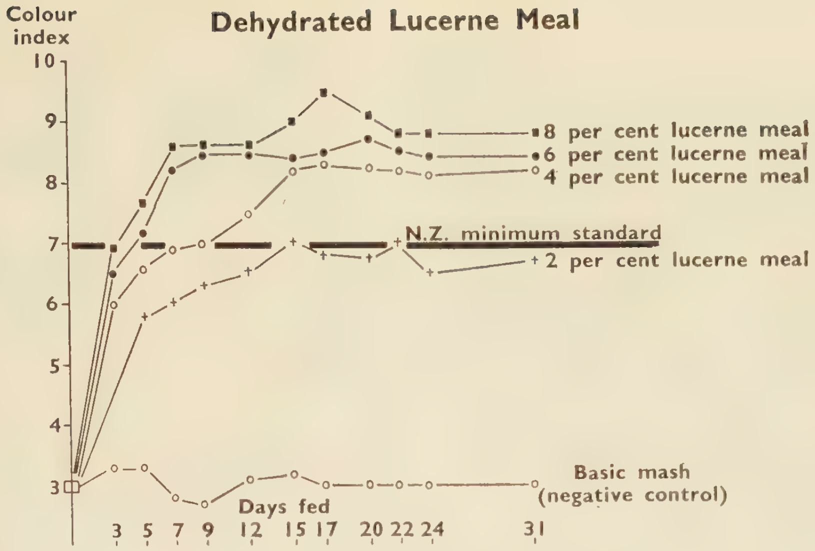
A logical development of the first test was a further investigation using feeding levels which the previous results suggested were most likely to give a yolk colour slightly better than the minimum colour called for by the New Zealand Egg Marketing Authority. The second test reported here was designed to give this information and to test the effect of various combinations of maize meal, lucerne meal, and B-apo-8-carotenal as they would probably be used commercially in rations for laying birds.

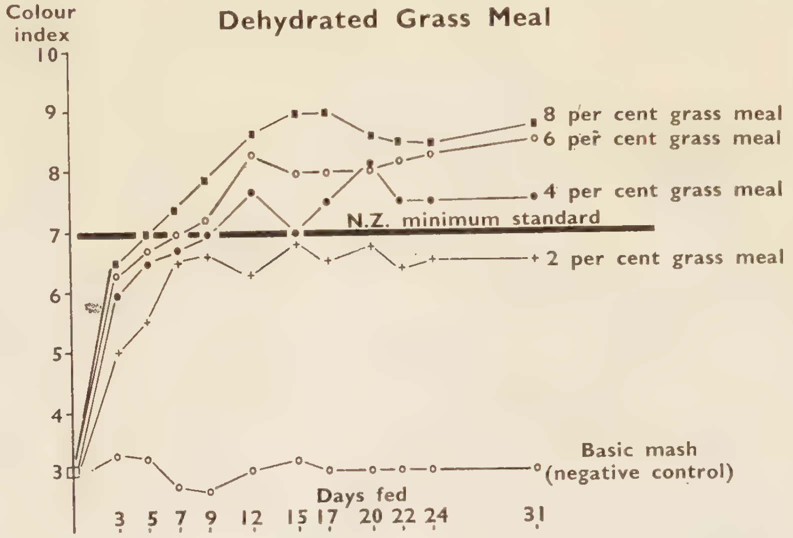
The graphs show that yolk → colour rose sharply in every case by the third day after feeding. Stable yolk colour was obtained after two weeks. Four per cent of dehydrated lucerne meal and grass meal exceeded minimum yolk colour required, while 2 per cent of these meals almost reached the minimum standard. Three parts per million of carotenoid pigment gave results similar to those from 2 per cent of dehydrated lucerne meal or grass meal, but 1.5 p.p.m. of carotenoid pigment failed to give satisfactory yolk colour.

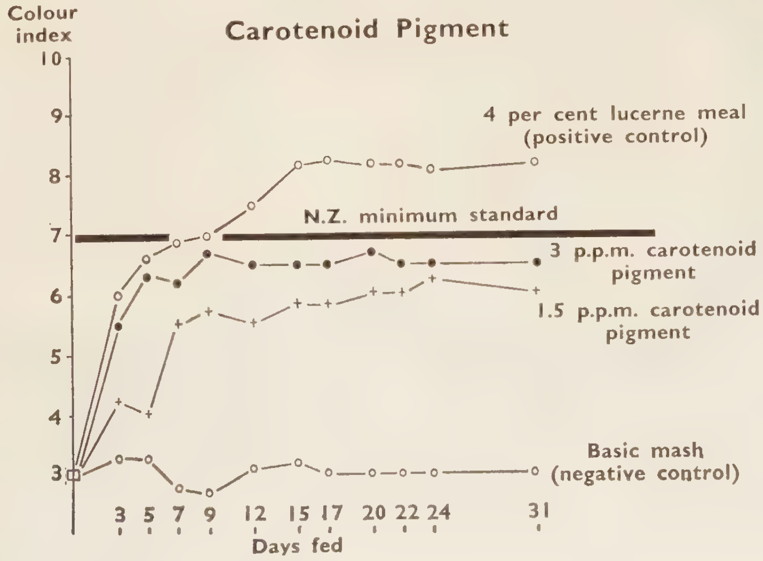
Method

White Leghorn x Australorp crossbred pullets in single-bird laying cages were fed a basic low-pigment mash similar to that used for the first test until yolk colour was reduced to a minimum. The pullets were then divided into 11 groups each of eight birds. All groups were fed the basic low-pigment mash, but different groups received additional rations as shown below.

Group	Lucerne meal per cent	Maize meal per cent	Apo-8-carotenal p.p.m.
1 ..	.. 4	—	—
2 ..	.. 3	—	—
3 ..	.. 3	6	—
4 ..	.. 2	6	—
5 ..	.. 2	—	1.5
6 ..	.. 2	—	3.0
7 ..	.. 2	6	1.5
8 ..	.. 2	6	3.0
9 ..	.. —	—	6.0
10 ..	.. —	25	—
11 ..	.. —	—	—







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Samples of eggs were saved from each group after four weeks of feeding. Six to ten eggs were opened from each group and the pigmentation of each yolk was classified against the colour fan.

RESULTS

Group	Lucerne meal	Maize meal	Apo-8-carotenal	Colour index Range	Colour index Average
	per cent	per cent	p.p.m.		
1	4	—	—	7½-8½	8.1
2	3	—	—	7-7¼	7.2
3	3	6	—	7¼-7½	7.5
4	2	6	—	6¾-7½	7.2
5	2	—	1.5	6¼-7½	7.2
6	2	—	3.0	7¼-8	7.6
7	2	6	1.5	7¼-8¼	7.8
8	2	6	3.0	7¾-8¾	8.0
9	—	—	6.0	6½-8	7.2
10	—	25	—	6¾-7½	7.1
11	—	—	—	3-3	3.0

It is apparent that if all eggs are to be above the minimum standard, a ration will have to give yolk pigment sufficient for an average of 7½ to 8 in the colour index.

Independent observers (all of whom had had some experience of eggs typical of those from group 11) found all groups acceptable, though preferring those approximating 8 in the colour index. Eggs falling markedly below 7 received unfavourable comment.

Groups 2, 9, and 10 produced yolks with enough colour to reach the minimum standard. As pigmentation was similar in each case, the cost of including the different supplements in a ration can be worked out and direct comparisons made.

The replacement of 1 per cent of lucerne meal by either 6 per cent of maize meal (group 4) or 1.5 p.p.m. of carotenoid pigment (group 5) did not affect yolk colour, as is shown by comparisons with the ration containing 3 per cent of lucerne meal (group 2).

Group 1 produced yolks with colour a good margin above the required minimum, and groups 3 and 6 produced yolks with a reasonable margin above the minimum.

Discussion

Four per cent of a first-quality dehydrated lucerne meal gave a desirable yolk colour. Three per cent, while producing an average colour equivalent to the minimum called for by the New Zealand Egg Marketing Authority, was considered marginal, as some eggs would be below the minimum standard. Six parts per million of B-apo-8-carotenal gave a similar result to 3 per cent of lucerne meal.

Lucerne meal at £35 per ton will cost £1 1s. a ton of ration if 3 per cent is included in the diet. The carotenoid pigment used in these trials, at an estimated cost of £35 per kilogramme, will cost £2 2s. a ton of ration if 6 p.p.m. is included in the diet.

Both lucerne meal and the pigment tested contribute appreciable quantities of vitamin A to the diet in addition to giving colour to egg yolks. Lucerne meal also provides other vitamins and trace elements considered desirable for laying birds kept intensively.

The availability of pigments of the type tested should enable formulation of diets, which, if required, need not contain xanthophyll-rich foodstuffs such as lucerne meal, grass meal, and maize meal. The prevailing cost, however, makes its use uneconomic.

The results demonstrate that where maize meal is included in a laying ration less lucerne meal (or grass meal) is needed to produce desirable yolk colour. As a guide, it would be reasonable to reduce the amount of lucerne meal or grass meal by 1 per cent for every 8 to 10 per cent of maize meal in the diet.

Acknowledgment

To Mr Norman Smith, Technical Officer of the New Zealand Poultry Board, who gave valuable cooperation in sampling of eggs and classification of yolk colour.

To F. Hoffman-la-Roche Ltd., who supplied the pigment "Apo-8-Carotenal Roche 10 per cent".

Radio Broadcasts to Farmers

1XH Hamilton, 12.33 p.m.

10 July—"Removal and Control of Milkstone in Milking Plant", by J. B. Cockerton, Special Inspector, Department of Agriculture, Hamilton.

17 July—"Liming and Topdressing", by J. R. Murray, Farm Advisory Officer, Department of Agriculture, Hamilton.

24 July—"Pest and Disease Control in the Garden", by E. Toleman, Horticultural Instructor, Department of Agriculture, Hamilton.

31 July—"Points in Pig Rearing", by M. Meldal-Johnson, Veterinarian, Department of Agriculture, Hamilton.

1YZ Rotorua, 7.15 p.m.

5 July—"Removal and Control of Milkstone in Milking Plant", by J. B. Cockerton, Special Inspector, Department of Agriculture, Hamilton.

19 July—"Young Farmers' Clubs", by Eastern Bay of Plenty Y.F.C. district committee.

2XP New Plymouth, 8 p.m.

6 July—"News and Views from the Farm Advisory Division", by G. R. Moss, Farm Advisory Officer, Department of Agriculture, New Plymouth. David Smith's Y.F.C. Session.

13 July—"Designs for Farm Dairies", by A. E. Pain, Dairy Instructor and Grader, Department of Agriculture, New Plymouth.

20 July—"The Radio Vet.", by J. H. Macdonald, Veterinarian, Department of Agriculture, New Plymouth.

2XA Wanganui, 8 p.m.

6 July—"For the Country Women", by Mary Macdonald.

13 July—Farming News.

20 July—"The Main Steps to Success in Pig Production", by E. M. Bailey, Supervisor, Taranaki District Pig Council.

27 July—"Wheat Growing in the Wanganui District", by A. A. Duncan, Farm Advisory Officer, Department of Agriculture, Wanganui.

2XG Gisborne, 8 p.m.

4 July—"What's in a Sheep's Liver?", by R. B. Bain, Supervising Meat Inspector, Department of Agriculture, Gisborne.

11 July—"For the Orchardist", by J. Overbye, Horticultural Instructor, Department of Agriculture, Gisborne.

18 July—Gisborne Veterinary Club.

25 July—"Important Pointers in Care of Young Pigs in Winter", by S. W. Rees, Supervisor, Bay of Plenty District Pig Council.

2XB Masterton, 6.45 p.m.

14 July—"Young Men for the Land", by R. Anderson, Manager, Wairarapa Farm of Instruction.

3YA Christchurch, 12.20 p.m.

3 July—"Pure Seed Production", by N. L. Shillito, Seed Production Officer, Department of Agriculture, Christchurch.

4YA Dunedin and 4YZ Invercargill, 12.36 p.m.

3 July—"Losses at Lambing Time", by W. K. McBean, Livestock Instructor, Department of Agriculture, Tapanui.

10 July—"Spring Topdressing", by G. K. McPherson, Fields Superintendent, Department of Agriculture, Dunedin.

17 July—"Problems of High-country Tussock Grasslands", by W. O. Sly, Soil Conservator, Department of Agriculture, Invercargill.

24 July—"Cause of Rejection at Works", by A. Baker, Supervising Meat Inspector, Department of Agriculture, Invercargill.

31 July—"Oversowing Hill Country", by R. C. Stephen, Farm Advisory Officer, Department of Agriculture, Balclutha.

Regular Sessions

1YA Auckland, Mondays at 12.36 p.m. ("Country Journal", including "Report from Ruakura"), Tuesdays, Wednesdays, Thursdays, and Fridays at 12.33 p.m. ("Country Journal"), Thursdays at 12.33 p.m. ("News for the Farmer").

1XN Whangarei, Mondays at 8 p.m. ("Northland Stock Market Report", followed by "Farming for Profit"), Wednesdays at 8 p.m. ("Farming for Profit"), and Fridays at 12.33 p.m. ("Farm News").

1XH Hamilton, Mondays at 12.36 p.m. ("For the Farmer", excluding first Monday in month and public holidays), Wednesdays at 12.33 p.m. ("Report from Ruakura").

1YZ Rotorua, Wednesdays at 7 p.m. ("Bay of Plenty Journal"), Thursdays, 12.33 p.m. ("News for the Farmer").

2YZ Napier, Tuesdays at 7.10 p.m. ("The Hawke's Bay Farmer"), and Thursdays at 12.33 p.m. ("News for the Farmer").

2XG Gisborne, Tuesdays at 8 p.m. ("Farm Session").

2XP New Plymouth, Thursdays at 8 p.m. ("Farm Session").

2XA Wanganui, Mondays at 8 p.m. ("For the Man on the Land"), Tuesdays at 8 p.m. ("Farm Supplement"), and Thursdays at 8 p.m. ("Farm Topics").

2XB Masterton, Fridays at 6.45 p.m. ("Farm Session").

2XN Nelson, Thursdays at 8 p.m. ("Nelson Farm Topics").

2ZA Palmerston North, Mondays at 12.36 p.m. ("Country Digest"), and Fridays at 8.30 p.m. ("Country Digest", including Feilding stock market report).

2YA Wellington, Mondays, Tuesdays, and Fridays at 7.10 p.m. ("Farm Session"), Thursdays at 12.33 p.m. ("News for the Farmer").

3YA Christchurch, Mondays at 12.20 p.m. ("Country Session"), Thursdays at 12.33 p.m. ("News for the Farmer"), and 7.10 p.m. ("Home Paddock").

3XC Timaru,. Wednesdays at 8 p.m. ("Farmers' Weekly News Service"), and Saturdays at 10.30 a.m. ("Country Mailbag").

3YZ Greymouth, Mondays at 12.36 p.m. Thursdays at 12.33 p.m. ("News for the Farmer").

4YA Dunedin, Mondays at 12.36 p.m., Tuesdays at 12.33 p.m., Wednesdays and Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.36 p.m., Wednesdays and Thursdays at 12.33 p.m. ("News for the Farmer").

Care of Livestock during July

By Wallaceville and Ruakura Animal Research Stations

MILK FEVER IN COWS

MILK fever is confined almost entirely to cows four years of age or over, animals previously affected being especially susceptible at subsequent calvings. Since the vast majority of cases occur from 12 hours before calving to 48 hours after, a close watch should be kept on all mature cows over the calving period. It is advisable to bring them into paddocks handy to the shed as soon as signs of approaching calving are noticed. Paddocks free from open drains and other hazards should be kept for this purpose. A look round the cows last thing each evening pays handsomely. These simple precautions enable veterinary assistance to be sought in the early stages of the disease.

REARING CALVES

Calves must be fed the first milk or colostrum as soon after birth as possible, and preferably over the first two days. Research at Ruakura has shown that Jersey calves, provided they have access to good quality pasture, can be reared successfully on a fixed quantity of seven pints of whole milk per day. As soon as the calves have learnt to drink and can consume five or six pints at a time, they can be fed once each day. Provided really first class pastures are available Jersey calves can be weaned when 120 lb liveweight or about 33½ in. in chest girth. On average this weight is reached at eight weeks of age. Where substitutes for whole milk are used they should be given in amounts equal in food value to the seven pints recommended, that is, 14 pints of separated milk, 1¾ lb of skim milk powder, or 1½ lb of buttermilk powder. If milk substitutes are fed during the first month, before the calves start eating appreciable quantities of grass, they should be supplemented with vitamin A.

PREVENTING LOSSES IN EWE FLOCK

More than 80 per cent of deaths in the ewe flock occur over lambing, when losses due to blood poisoning, bearing trouble, sleepy sickness, milk fever, and lambing difficulties occur.

Blood poisoning: This can be prevented by vaccinating the ewes with the mixed blackleg-malignant oedema vaccine. If this is done about a fortnight before lambing, the immunity will also be passed on to the lambs in the first milk. This will give protection against both navel infection in very young lambs and blood poisoning after docking.

Bearing trouble: Research at the Ruakura Hill Country Station strongly suggests that a predisposition to bearing trouble is inherited. It has also been shown that the occurrence of cases in a susceptible flock can be induced by full feeding a week or so before lambing.

Lambing difficulties: A very high level of feeding over a more prolonged period, five or six weeks before lambing, may result in a proportion of very big single lambs. This leads to lambing difficulties and often a high death rate among both ewes and lambs.

Milk fever: Sudden changes in feed a few weeks before lambing, particularly to lush growth or to recently established pastures, often result in an outbreak of milk fever. Excessive driving and prolonged yarding of in-lamb ewes, for example at crutching time, are other causes directly associated with the development of this disease.

Sleepy sickness: Sleepy sickness can be experimentally induced, particularly in ewes carrying twins or big single lambs, by lowering the flock's level of feeding during the last week or so before lambing.

To minimise losses from these diseases requires skill and judgment in the management of a flock of ewes during the last few weeks before lambing; first to ensure that the flock is given a moderate lift in the level of feeding, and second to avoid sudden changes which result in either a check in nutrition or in too liberal grazing on lush pastures.

PULPY KIDNEY IN LAMBS

Where pulpy kidney occurs in lambs under six weeks of age its incidence can be reduced by vaccinating the ewes before lambing. If ewes have never been vaccinated before, best results will be obtained from two doses of vaccine given at least a month apart. Ewes which were vaccinated last year will require only one vaccination.

The last (or the only) vaccination should be given about a fortnight before lambing and this can be done quite safely if ewes are handled carefully. Very poor immunity results where the ewes are vaccinated much earlier. If most losses from pulpy kidney occur in lambs over six weeks of age, vaccination of ewes is of no value, but vaccination of lambs at marking with a second dose later may help.

RINGWORM IN CALVES

Ringworm in calves is sometimes troublesome, especially in poorly nourished calves. Before any remedy is applied the scales should be removed by rubbing in a mixture of equal parts of soft soap and lard and scraping off the softened scabs the next day. The bare patches should then be dressed with an ointment of 1 part of salicylic acid and 8 parts of lard or with any registered stock remedy for ringworm which is available.

As the infection can be transmitted to man, it is wise to wear rubber gloves when treating ringworm. In any case the hands and arms should be thoroughly washed immediately after the dressings are applied.

ERGOTISM IN CATTLE

Hay made from ergotised grass will cause lameness and sometimes even loss of feet in cattle. The small black ergots which replace the seeds of ryegrass and other grasses can be easily seen, and if they are present in large numbers, the hay should not be used. Similar trouble often occurs when cattle are grazed on tall fescue grass even when no ergots are present. This grass should be regarded as poisonous and should not be grazed by cattle.

Seasonal Notes

By Farm Advisory Division

SPRING SOWN WHEAT IN THE NORTH ISLAND

LAND for spring wheat should be ready for sowing during August and September. The seed should be of high germination and not more than three times removed from hot water treatment to avoid loose smut infection. Growers can be assured of this by the purchase of certified seed and the inspection of the relative purity and germination certificate, which indicates the germinating capacity of the line. Seed should also be treated with an organic mercury or thiram seed dust to guard against soil-borne fungous diseases.

The rate of seeding is 2-2¼ bushels per acre sown with 1½ to 2 cwt of superphosphate. Sowing in 3½ in. rows by fitting Blackmore coulters to the conventional grain drill has given very satisfactory results in Hawke's Bay over the last two seasons and can be recommended for trial elsewhere.

The varieties of which certified seed is available are Aotea, Tainui, and Gabo. The last is prone to sprouting in the ear in a wet harvest season. Crops of Festival grown from seed imported from Australia did well in the 1960-61 season, but locally grown certified seed is not yet available.

—A. J. COUGHLAN, Hastings

* * *

DRAWING UP A WORKING BUDGET

FARMERS contemplating further farm improvements or expenditure on deferred maintenance work in the coming season should consider drawing up a working budget now. The working budget should be looked on as a medium through which farm plans can be formulated in relation to probable financial results.

Briefly the objects and advantages of preparing and using a current working budget are:

1. As an aid to farm management planning for the coming season.
2. To enable expenditure to be related to income.
3. To estimate requirements for working expenses and generally to aid the control of finances during the year.

The budget should usually be based on a period from 1 July in one year to 30 June in the following. This is in effect the working year of the farm; the end of each yearly cycle of events and the beginning of the next.

Practical assistance in compiling working budgets can be obtained from your local Department of Agriculture Farm Advisory Officer or from Farm Advisory Officers (Economics) at Dunedin, Christchurch, Ashburton, Palmerston North, Hamilton, and Auckland.

—R. J. TOWNSLEY, Auckland

* * *

CONTROL OF CALIFORNIAN THISTLE

IF allowed to grow unchecked, Californian thistle becomes a serious weed, not only in crops, where yields are lowered, but in pastures, where large areas can be lost from grazing. Because of the strong underground root system, control is difficult, but hormone weedkillers have been reasonably effective in reducing infestations. Ploughing and cultivation followed by spraying of regrowths is successful, but grazing is lost for a considerable period through the paddock being under cultivation.

In young pastures best control is obtained from either MCPB or 2,4-DB at 1 to 2 lb of acid equivalent per acre. In old-established pastures similar treatments are effective when applied at maximum leaf growth, but repeated applications are necessary in any one season. If spraying is delayed until flowerhead formation, 1 to 2 lb per acre of an ester of 2,4-D should be used. Alternatively mowing and spraying in autumn with either MCPB or 2,4-DB is satisfactory.

In crops resistant to hormones MCPB at 1 lb per acre in peas, 2,4-DB at 1 lb per acre in lucerne, and MCPA at 1 to 1½ lb in cereals give good control. In brassicas SMCA at 15 lb per acre will check the thistle without causing excessive crop damage.

—B. A. J. SMITH, Hawera

* * *

PLANNING FARM DRAINAGE

DRAINAGE must be considered in relation to the farming programme as a whole. Where intensive farming is practised wet land is a liability which must be overcome at the earliest possible opportunity. On larger properties, however, where wet land may form only a small proportion of the total area the costs and likely returns from drainage must be compared with an equivalent expenditure on development or improvement of other parts of the property.

If you decide to proceed with a drainage programme, all of the wet area, whether it is just one paddock or all of the farm, should be examined and if it appears likely that the whole can be incorporated into one scheme a plan should be prepared for the complete area at this stage. Installation may be undertaken piecemeal as time and money permit, but each year's operations will then fit into what has been done before.

The winter offers good opportunities to observe the problems and time to plan drainage, obtain outside advice if necessary, order tiles, and arrange contractors for the following spring or summer.

—J. F. SCOTT, Christchurch

* * *

TOPDRESSING LUCERNE

REGULAR removal of large quantities of lucerne from any stand quickly depletes the soil of many plant nutrients needed for vigorous lucerne growth. If the stand is to remain vigorous and productive, the supply of plant nutrients must be replenished and held at a high level. Lucerne should be topdressed every spring, either before rapid growth has begun or immediately after the first cut has been removed.

The kinds and quantities of fertilisers that should be topdressed on to any lucerne stand depend on the type of soil on which it is growing. On some soils annual applications of 2 to 3 cwt per acre of superphosphate are enough to maintain vigorous lucerne growth, but on many others annual applications of 2 cwt per acre of muriate of potash are also required. On a few soils annual applications of 20 lb of borax per acre may be needed too. In addition to these annual topdressings, some lime and molybdenum may be required every four or five years in certain areas.

Precise recommendations for topdressing of a particular lucerne stand should be obtained from the local Farm Advisory Officer.

—R. C. STEPHEN, Balclutha

ROUND THE RESEARCH STATIONS

Current Work and Findings in Department of Agriculture and Department of Scientific and Industrial Research Trials and Experiments

Tobacco Research Station

Bulk Drying of Tobacco

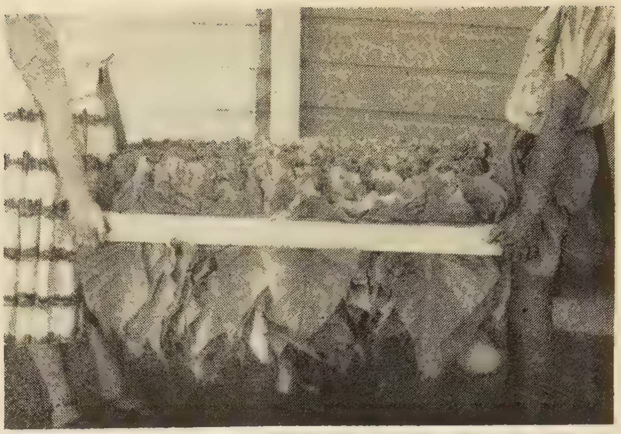
Methods of loading kilns have altered little since the inception of flue-curing of tobacco leaf during the middle of the nineteenth century. Before being loaded into the kiln the leaf is tied in "ties" of three or four leaves, about 40 ties being placed on each 4 ft stick. This is a time-consuming and labour-demanding operation, nine women being required to tie sufficient leaf to fill a kiln in one day.

Recent work has indicated that leaf can be cured successfully when packed tightly into baskets or held in clamps.

Clamps consist of two pieces of wood 3 in. x 2 in. and 4 ft long. One has a series of metal rods spaced 3 in. apart along the 3 in. face. This is laid rods upward and after the tobacco has been placed by the armful to almost twice the height of the rods, the other member of the clamp is connected, compressing the tobacco into a shape 1 ft x 4 ft.

Baskets are made of 6 in. wide steel reinforcing mesh with no top and a false side. The basket is laid on its side, leaf placed by the armful to almost 1½ times the height of the basket, the leaf compressed, and the false side connected. Steel rods are then forced through the leaf and the basket is turned upright and loaded into the kiln.

By these methods 100 lb of green tobacco or about six sticks can be cured in the space formerly required for two sticks. Any attempt to pack the leaf flat and neatly results in the centre of the bale not drying. If the leaf is placed in handfuls with no attempt to make an orderly pile, the bundles dry completely. Increasing the weight of the bundle to 120 lb of green leaf results in the bale remaining wet in the centre.



Tobacco leaf held in a clamp.

Further work to determine the most satisfactory rates of air flow for drying is contemplated. When developed fully the method should speed up kiln-loading procedure and reduce labour demands considerably.

Wallaceville

White Muscle Disease in Chicks

As the result of hens being fed on a pasture diet 100 per cent incidence of white muscle disease has been produced experimentally in chicks from the eggs. Chemical fractionation of the pasture is being carried out to determine the location of the toxic substance or deficiency.

Wallaceville

Molybdenum and Sulphur Topdressing

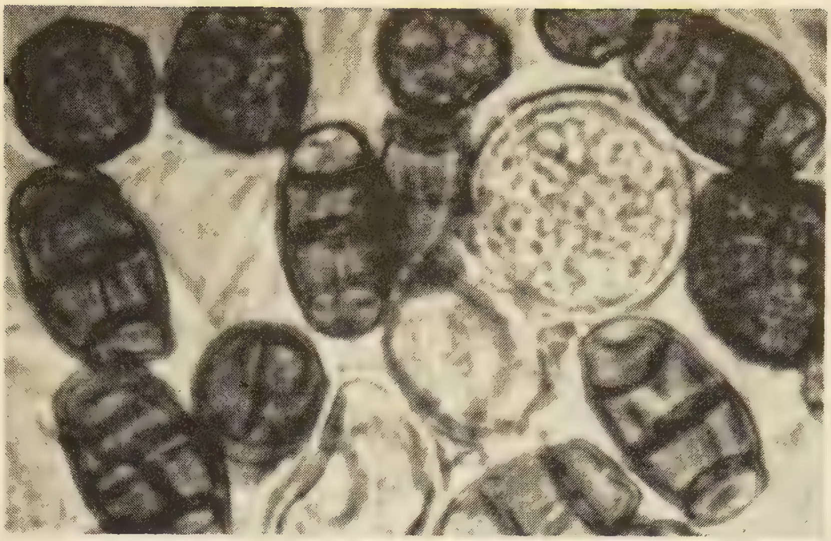
A paragraph describing the effect of molybdenum and sulphate on copper in lambs appeared in "Round the Research Stations" on page 379 of the April issue of the "Journal". This referred to a trial carried out under special experimental conditions at Wallaceville and should **not** be taken to mean that molybdenum topdressings will invariably cause copper deficiency in stock. On the contrary it is only on certain kinds of soils that the use of molybdenum should be avoided. These areas are shown in Department of Agriculture Bulletin No. 378, "Molybdate Topdressing and Animal Health", copies of which are available from offices of the Department.

Properly used, molybdenum and sulphur are valuable fertilisers which have proved of immense benefit in certain parts of New Zealand, but careless or irresponsible use of them could be harmful. Local farm advisory officers can advise farmers regarding the best use of these fertilisers.

FACIAL ECZEMA

SPORE COUNT INVESTIGATION

IN the summer and autumn of the 1960-61 season the Department of Agriculture carried out a large-scale project to study the incidence throughout New Zealand and the seasonal variations of the fungus (*Pithomyces chartarum*) which has been shown to cause facial eczema. As a result of this work our knowledge of the disease has been increased and it should be possible to use counts of spores of this fungus as a means of improving the reliability of the facial eczema warning service.



Photograph of spores of *Pithomyces chartarum*, the fungus shown to cause facial eczema, as seen through a microscope. They have a typical "hand grenade" appearance.

SINCE the discovery that the fungus *Pithomyces chartarum* caused facial eczema disease research workers have been investigating the conditions which favour the rapid growth and multiplication of this organism and means of determining its incidence in the field. The fungus does not appear to grow on the living plant, but mainly on dead plant material in the pasture. Its spores or fruiting bodies are produced in great numbers under suitable conditions of moisture and temperature.

Research workers at the Department of Agriculture's Manutuke Research Station established a definite connection between the numbers of spores produced by this organism and the proneness of the pastures to produce facial eczema in lambs grazing such pastures. Dr P. J. Brook developed a mobile spore trap to measure this spore load, and the stage was set for a study of the incidence of the fungus in various districts and the seasonal changes in spore numbers. At the same time it was possible to investigate various factors which might be associated with changes in spore numbers.

The field spore trap is rather like a lawnmower with beaters in place of blades. Spores are dislodged from the pasture by these beaters and are then sucked on to a sticky microscope slide. The volume of air passing through the machine is measured and the spores caught on the slide are assessed in relation to the amount of air that passes over the slide. Manutuke workers showed that the sample of spores as measured by the trap is directly related to the number of spores that can be counted by using more precise but time-consuming washing techniques to estimate the spore load on cut pasture samples.

Organisation of the Project

In each of 13 districts the local Farm Advisory Officer selected eight fields for the most part on farms with a history of proneness to facial eczema. (The Hamilton farms were studied by officers at the Ruakura Animal Research Station.) The districts were Whangarei, Dargaville, Pukekohe, Hamilton, Morrinsville, Matamata, Tauranga, New Plymouth, Palmerston North, Hastings, Gisborne, Blenheim, and Ashburton.

In each field two samples were taken each week on microscope slides, using the field spore trap, together with measurements of rainfall, temperature, assessments of the pasture, litter, and other factors. Livestock Instructors arranged for examination of livers of stock killed at freezing works and on

Acknowledgments

THE investigation described was made possible by the cooperation of a large number of advisory and research workers, among whom the following deserve special mention:

Dr P. J. Brook, Plant Diseases Division, Department of Scientific and Industrial Research, and **A. J. Yates**, Auckland Industrial Development Laboratory, who designed the field spore trap and carried out some of the field investigations.

J. E. Bell, Fields Superintendent, Department of Agriculture, Auckland, who assisted in organisation of the field work.

R. E. Rose and **P. F. Noble**, Rukuhia Soil Research Station, who organised forwarding of microscope slides and the spore-counting service, collection of meteorological information, and general supervision of the field work.

Miss B. D. Matthews and staff at the Seed-Testing Station, Palmerston North, for spore counting on some 4,000 slides.

F. T. Lees, **J. Drew Smith**, and **W. E. Crawley**, Ruakura Animal Research Station, for spore collection and counting in the Waikato.

Farm Advisory Officers at Whangarei (**C. E. Ballinger**), Dargaville (**B. T. Jordan**), Pukekohe (**A. Wright**), Morrinsville (**D. L. Janett**), Matamata (**B. A. Gunning**), Tauranga (**A. V. Allo**), New Plymouth (**G. R. Moss**), Palmerston North (**P. R. Hockey**), Hastings (**A. J. Coughlan**), Gisborne (**H. de O. Chamberlain**), Blenheim (**J. P. Beggs**), and Ashburton (**E. Delahunty**) for the weekly collection of spores in the field.

E. A. Madden, Farm Advisory Officer (Agrostology), Palmerston North, for a survey of pastures on sampling sites.

P. B. Lynch, Senior Principal Scientific Officer, Department of Agriculture, Wellington, for general organisation of the project.

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Persons now owning 25 or more laying birds (hens and ducks), and who sell or offer to sell eggs, are required under THE POULTRY-RUNS REGISTRATION ACT, 1933, to register their flocks within one month from 1st June, the prescribed registration fee being 2/6 per 100 birds, or part thereof.

Failure to register an existing poultry-run during one, or within one, month in the case of a new farm being established renders the occupier upon summary conviction to a fine of £1 and to a further fine not exceeding 2/6 for every week that elapses after the prescribed period until registration has been effected.

By completing the necessary registrations as required under the Act poultrykeepers will obviate the necessity for the Board to prosecute offenders, and will also greatly assist in determining flock movements and forward egg production trends of the poultry industry.

Application forms for registration purposes are available on request and may be completed at any Post Office, Money Order Office, or direct from the New Zealand Poultry Board, Box 379, Wellington.

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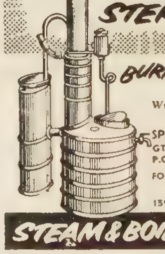

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the farms and for the examination of farm stock for the incidence of eczema. Detailed studies were made of the pasture species in each field.

The slides, after exposure in the spore trap, were sent to Seed-Testing Station, Palmerston North, where the numbers of spores adhering to their sticky coating were counted. If spore numbers rose to what were considered to be dangerous levels, arrangements were made for twice-weekly sampling of the pastures in question. All the information collected in the investigation was forwarded to a central office for analysis. It is now possible to make a preliminary assessment of the results, but it is clearly necessary for experimental work to be continued next year.

RESULTS

Spore trapping commenced in most districts in early December 1960 and continued into May 1961. This covers the time when facial eczema is likely to occur, although outbreaks are more usual in the February-April period.

Districts

The 13 areas considered could be classed into three main groups.

1. Spore numbers at no time rose to dangerous levels (Gisborne, Marlborough, and Ashburton)

Gisborne experienced a most unusual season with much above average rainfall and pastures continuously fresh and vigorous. After the more usual summer drought many pastures in the Gisborne area are particularly dangerous for facial eczema. On the other hand, the South Island is usually free of the disease, though occasional outbreaks of eczema have been reported in its northern districts. It was interesting, therefore, that spore numbers were occasionally at moderate levels near Blenheim, but never rose above negligible amounts in Ashburton. The fungus is definitely present in Canterbury, but it seems that climatic conditions do not allow its multiplication to dangerous levels.

2. Spore numbers for the most part low, but occasionally high on some farms

Hawke's Bay: On one field out of eight, high spore counts were recorded at times. As at Gisborne, the season was unusually wet.

Palmerston North: Three fields (out of eight) gave substantial counts late in the season, but only one of these reached dangerous levels for a time.

Tauranga: Four fields out of eight reached very high levels at times, but in only two of these fields were really dangerous spore numbers recorded. One of these, on a dairy farm, showed continuously high counts and this farm had a serious outbreak of facial eczema late in the season.

Whangarei: Four fields out of eight recorded very high counts, but for a short period only. In most years Whangarei is a relatively "safe" district.

3. Spore numbers at dangerous levels for a considerable period on most farms

These conditions applied in Dargaville, Pukekohe, Morrinsville, Matamata, Hamilton, and New Plymouth.

Seasonal Changes in Counts

All fields in the North Island showed a peak in spore numbers in late February and early March, with March and April counts generally high. Subsidiary peaks occurred in some districts, but there was a **remarkable agreement in the pattern of spore count changes over the season among the eight fields in each district.**

Relation with Other Factors

Dead material in the sward (litter): Fields giving high spore counts generally had considerable amounts of litter, but not all fields with much litter gave high counts. Research work has shown that where climatic conditions are right for the fungus to thrive, it is possible to bring about a dramatic increase in spore numbers by increasing the amount of litter.

Pasture species, type of grazing, soil type: These factors did not seem to be clearly associated with spore counts as measured in this project.

Shelter: There is a tendency for well sheltered fields to have more rapid and more marked rises in spore counts. This was especially the case on one property in Tauranga.

Incidence of Facial Eczema and Spore Counts

There was a definite tendency for higher spore counts to be found on farms which had a bad history of facial eczema. For the season under review facial eczema data are not yet complete. However, from the information available it seems that cases of facial eczema (clinical and/or liver damage only) have occurred only on farms giving high spore counts for a period, and that districts with a considerable proportion of fields giving high counts (such as North Taranaki) have had more general outbreaks of facial eczema than districts where counts were generally low.

Facial eczema was not by any means found on **all** farms where high spore counts were recorded. In many cases this is no doubt due to adequate precautions having been taken by the farmer.

SUMMARY

SPORE COUNTS would seem to be a useful and practical means of assessing pastures for present or potential facial eczema danger.

- If the weather and spore counts indicate dangerous conditions for facial eczema, warnings are fully justified.
- If counts are not rising despite apparently dangerous weather, warnings are not justified, provided such counts have been taken on fields which respond in spore numbers when conditions are right.

Spore counts should, therefore, greatly improve the facial eczema warning service, which indicates the time when stock should be shut up away from dangerous grass.

ON THE INDIVIDUAL PROPERTY the farmer should take into consideration the history of proneness to facial eczema, the amount of dead material in the sward, and the shelter when deciding what paddocks to pick for holding stock at the required high density during a warning period. At the present stage of the investigations it is **not** possible to use spore counts to advise farmers that any paddock is safe to graze. **The usual recommendation to concentrate stock during a warning period must still be followed.**

IN THE SOUTH ISLAND it would seem that facial eczema is unlikely to occur except in sheltered, warm paddocks in Nelson, Marlborough, and Westland in a season where warm, moist weather gives conditions favourable to the increase of the fungus.

GRASS GRUB CONTROL

Positive Results with D.D.T. PRILLS

THOSE large bare patches in pastures can mean grass grub. But long before these patches appear there is a serious decrease in grass growth. Control of grass grub results in spectacular pasture improvement, and there are cases where farms have doubled in production after eradication.

Control of grass grub is achieved by the application of D.D.T. at the rate of 1 to 2 lbs. per acre of 100% p.p.i. D.D.T. This is a very small amount to spread over an acre of land and as effectiveness depends on *even dispersal* the method of application is most important.

It is also important that the method used should not leave the insecticide clinging to herbage but should bring the D.D.T. into immediate contact with the soil. Dusts and sprays obviously do not completely fill these requirements.

D.D.T. PRILLS, a new approach

The technical dictionary defines prills as "spherical particles about the size of buckshot". *D.D.T. PRILLS* are a TARTAN product manufactured by the Farm Chemicals Co. The D.D.T. in ultra-fine *"Micronized" form is bound to a core of inert material. Once applied the fine particles of D.D.T. are removed from the core by rain or soil moisture and dispersed in among the grass roots.

ADVANTAGES OF D.D.T. PRILLS

1. An accurate known dosage of D.D.T. per acre.
2. Heavy enough to resist dispersal by wind and therefore fall more accurately on the area being treated.
3. Can be applied by aircraft or ground machine in wind conditions when dust or spray application is impractical.
4. Prills are heavy enough to bounce off foliage and fall through on to the soil surface, where they are required, thus lessening the risk of pick-up by grazing stock.

NOW is best time to apply D.D.T. PRILLS.

D.D.T. Prills can be applied at any time but between March and August is ideal. At this time the grubs are in the top two inches of soil and the autumn and winter rains will readily disperse the D.D.T. Application now will also achieve control before the flush of spring growth.

Methods of Application

D.D.T. Prills can be applied by aircraft. For ground application the best method is the TARTAN Speed Spreader which can accurately treat from 15 to 20 acres per hour.

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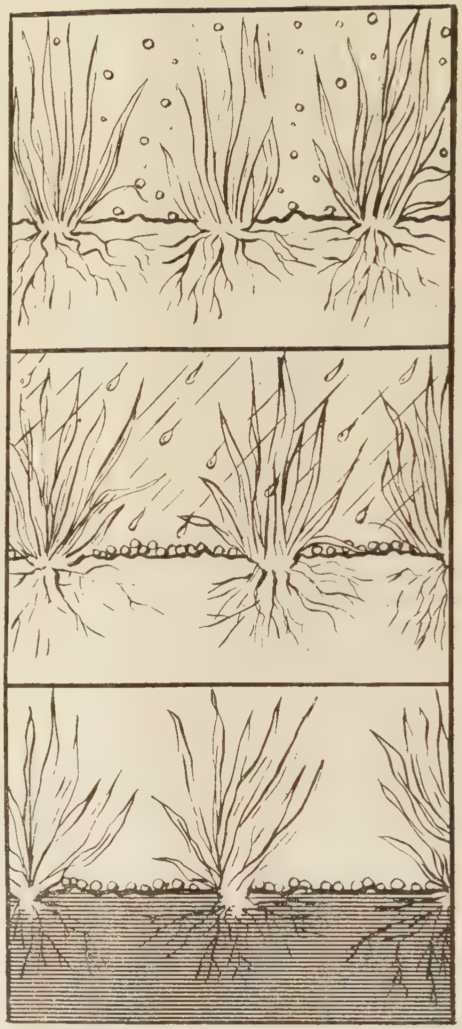

Top: Spread by ground machine or aircraft. D.D.T. Prills bounce off foliage and drop to the soil surface, thus reducing the hazard of D.D.T. pick-up and contamination to grazing stock and the risk to bees on crops in flower.

Centre: Once the Prills are on the ground, rain and surface moisture wash the coating of ultra fine *"Micronized" D.D.T. from the marble core and disperse the particles through the soil around the grass roots.

Bottom: The inert marble remains visible on the soil surface having served its purpose as a carrier for the D.D.T. which is now evenly distributed in the soil to protect the roots from the ravages of Grass Grub.

Vegetable Growing for HOME and MARKET GARDENERS

Shelter

By A. G. KENNELLY,
Horticultural Instructor, Department of Agriculture, Dunedin

SHELTER is important in the production of many vegetable crops, especially tender and early crops. Some areas are highly favoured for vegetable growing because the contour of the land gives protection from frost and wind; others have high belts of trees to break the force of prevailing winds. But cloches, hot-caps, frames, glass or plastic-covered houses, hedges, fences, brush shelter, soil ridges, and even bales of straw may all be used by home and commercial gardeners to improve growing conditions.

EXCEPT in the most exposed situations, most main-crop vegetables can be grown round the main areas of population in New Zealand without special shelter, but for early crops shelter is a main consideration. It can be obtained from conformation of the land, belts of trees, hedges, fences, or by use of cloches or glass or plastic-covered frames or houses.

Temperature is most important in governing the speed of chemical processes in both soil and plants and within limits set by the kind of crop, growth rate increases with temperature. The damaging effect of a strong wind and the cooling effect of cold winds are well known, but just how great is the retarding effect on growth of lower temperatures induced by cold winds is not always recognised. The effect is less on very hardy plants which are close to the ground and on root crops, but strong winds may seriously damage foliage and so reduce yield of even hardy dwarf plants.

Hardy vegetables will grow at quite low temperatures, though their growth rate will be slow. With some crops where the foliage forms a comparatively solid mass most of the crop may be relatively unaffected by wind, but strong, cold winds are likely to retard any crop. The degree to which they are affected will depend on the speed of the wind (which may cause mechanical injury), the temperature reduction caused, and the difference between wind temperature and the optimum temperature for growth of the crop. Shelter is, therefore, important where consistently strong winds or very cold winds are experienced and is most important for tender crops and early crops.

Large trees are not much used as shelter for vegetable crops because

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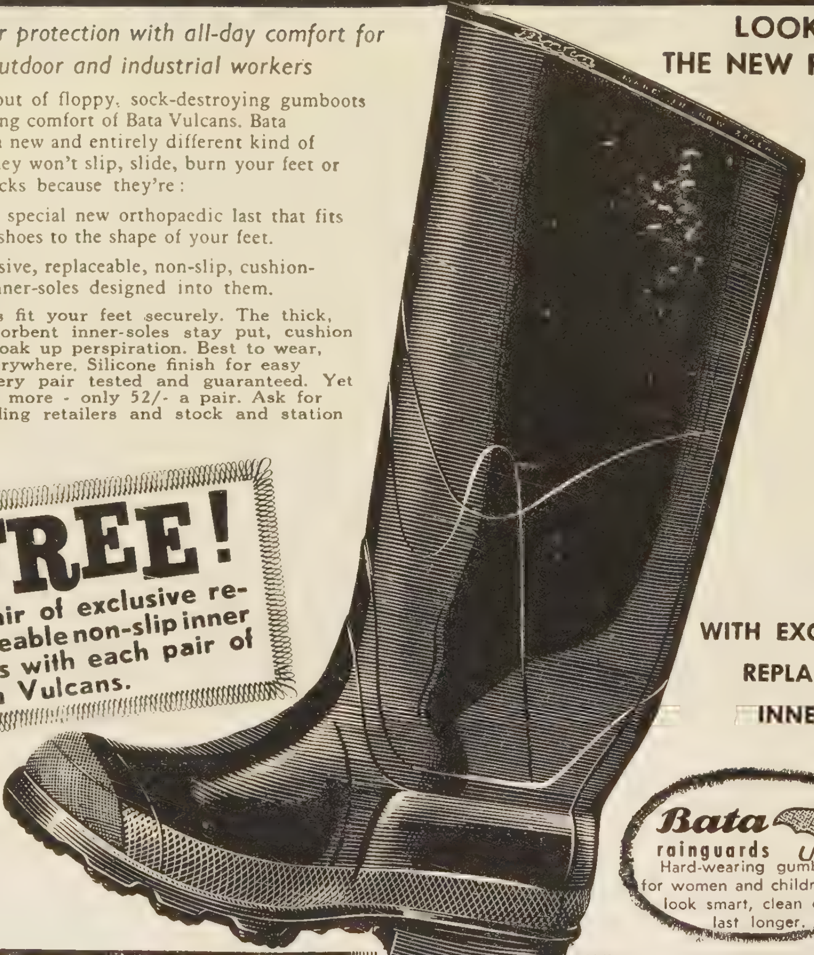

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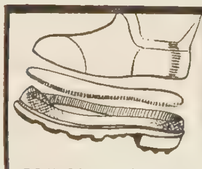

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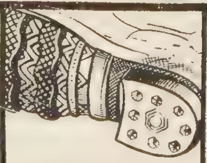

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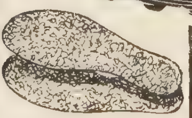

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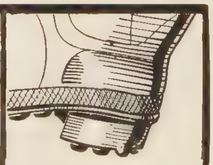

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they impoverish the ground, usually within 15 to 20 ft of their bases but over a much wider area with trees with widely spreading roots. High trees may also reduce the light available to vegetables. They are most useful when sited well back from the cultivated area to temper a strong prevailing wind but not reduce light and rob soil of nutrients and moisture.

Some large trees, such as poplars, can be kept trimmed to 6 to 8 ft high, but ordinary hedge plants are usually better, as their root range is less and they are easier to maintain.

Fences or trellises, double wire netting or brush shelter, or even plant rows of taller vegetables may be used as alternatives to hedges.

Trees

Poplars trimmed to heights suited to the circumstances are among the best and most widely used shelter trees for commercial gardens, being easily established and quick growing. Some form of root pruning is usually necessary. Other trees that have been widely planted for boundary shelter on large areas include willows, notably pussy willow (*Salix caprea*) and the crack willow (*Salix fragilis*). They are of limited value as shelter trees and must be kept trimmed. Before any of these trees are planted the local body should be asked whether the species is regarded as a noxious weed.

Cupressus species have also been used and may be trimmed and grown as hedge plants. Also used to some extent have been pines (which must be planted closely and kept trimmed), *Acacia verticillata* (which makes a good hedge in some districts), and eucalypts (most of which are unsuitable for shelter round vegetable gardens).

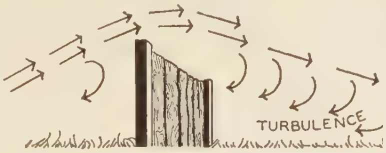
Choice of a hedge suited to the district or situation is important. Commercial growers should consult their nearest Horticultural Advisory Officer about this. Some of the more widely grown hedges are:

Abelia chinensis (*floribunda*), *Acacia verticillata*, broadleaf (*Griselinia littoralis*), *Berberis vulgaris*, taupata (*Coprosma baueri*), *Chamaecyparis lawsoniana*, *Cupressus lusitanica* var. *benthamii*, *C. macrocarpa*, *Cydonia japonica*, *Elaeagnus japonicus*, *Escallonia exoniensis*, *E. macrantha*, *Euonymus* sp., hawthorn (*Crataegus* sp.), holly (*Ilex* sp.), laurel (*Prunus laurocerasus*), *Lonicera nitida*, ngaio (*Myoporum insulare*), *Olearia traversii*, golden akeake (*Olearia forsteri*), *Phebalium billardieri*, karo (*Pittosporum crassifolium*), *P. eugenioides*, *P. tenuifolium*, privet (*Ligustrum* sp.), *Tamarix* sp., *Tecoma capensis*, tree lucerne (*Cytisus proliferus*), and yew (*Taxus* sp.).

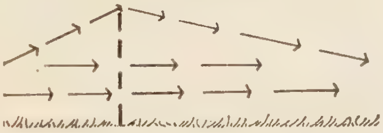
A disadvantage of a hedge is that if it is quick growing it needs frequent cutting and if slow growing it is long in establishing. If it is vigorous, the roots may range widely and take up a large amount of moisture and plant food from adjacent ground. If it is weak rooting, it will not grow satisfactorily unless the soil is good. It may be attacked and weakened or killed by diseases such as collar rot and silver leaf or by caterpillars or midges. Privet is one of the hardiest and most trouble free hedges. It is a strong grower in good soil, but tolerates adverse conditions.

Open or Permeable Barriers Best

Contrary to the general assumption the ordinary thick hedge, solid fence, or similar barrier of moderate height gives little shelter except in its immediate lee. A solid barrier causes all the air moving along as a wind to rise over the barrier. As a result there is almost a calm immediately in the lee of the barrier, but a short distance to leeward, the air descends with an eddying motion, which if the wind is strong, may batter tender plants such as cucumbers, melons, and dwarf beans.



SOLID BARRIER



PERMEABLE BARRIER

Results are better with a permeable barrier such as trellis or open lath fence, a thin hedge or thin brush shelter, or even with double wire netting, as some of the air comes through the barrier and some over it. In English trials a fence made of 1 in. laths with 1 in. spacings proved very suitable for vegetable crops.

The resulting flow of air on the leeward side is much smoother with a permeable barrier than with a solid one. The wind immediately in the lee of an open type of barrier is stronger than in the lee of an impermeable barrier, but the shelter provided by the open type of barrier extends further.

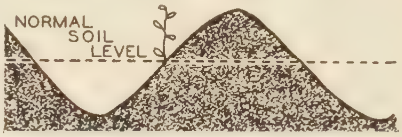
A rough guide can be obtained of the shelter effect of an open type barrier from the fact that usually the maximum shelter effect is at a distance of between four and eight times the height of the shelter to the lee of it, and useful shelter is usually given to the lee of it for up to 20 times its height. The shelter effect then gradually diminishes until at a distance of about 50 times its height little or no shelter is given.

Annual Crops as Shelter

Plants fairly tolerant of moderate wind that are grown as annual crops and sometimes used to shelter tender crops include broad beans, sweet corn, and Jerusalem artichokes. They can give useful shelter to tender crops such as melons, cucumbers, runner beans, or tomatoes. They should be planted to break the force of the prevailing wind without depriving the plants being sheltered of sunlight.

Soil Ridging

Ridges can readily be thrown up with a plough and seedling plants set out in their lee to obtain the maximum sunshine and shelter. Plants should not be set too low on the sheltered side of the ridge or the advantage of shelter and warmer air will be outweighed by the colder and often wetter soil at the base of the ridge.



Glass and Plastic-covered Houses

Glasshouses are costly to build, maintain, and heat and production in them is confined to relatively high-yielding or high-cost crops. Most of these can be produced profitably only by skilled and experienced growers.

Plastic-covered houses can be built much more cheaply than glasshouses, but plastic is not a true substitute for glass. It does not last or hold heat as well, and though it is resistant to a wide range of chemicals and does not rot in contact with the ground, it is easily torn or frayed. Clear plastic tends to deteriorate after long exposure to sunlight.

However, plastic can be used for propagating, as covers on framework to form cloches or frames or plant houses, for lining glasshouses, and in many other ways. Black plastic is used as a "mulch" over plant beds (strawberries, for example, and sometimes tomatoes), to suppress weeds, keep the soil warmer, and retain moisture.

Hot-caps

Cone shaped, waxed paper protectors are used by some vegetable growers to advance the growth of tomatoes, cucumbers, and other plants set out early. Their value is limited and they are not as effective as cloches, but they are cheaper and suited to widely spaced plants.

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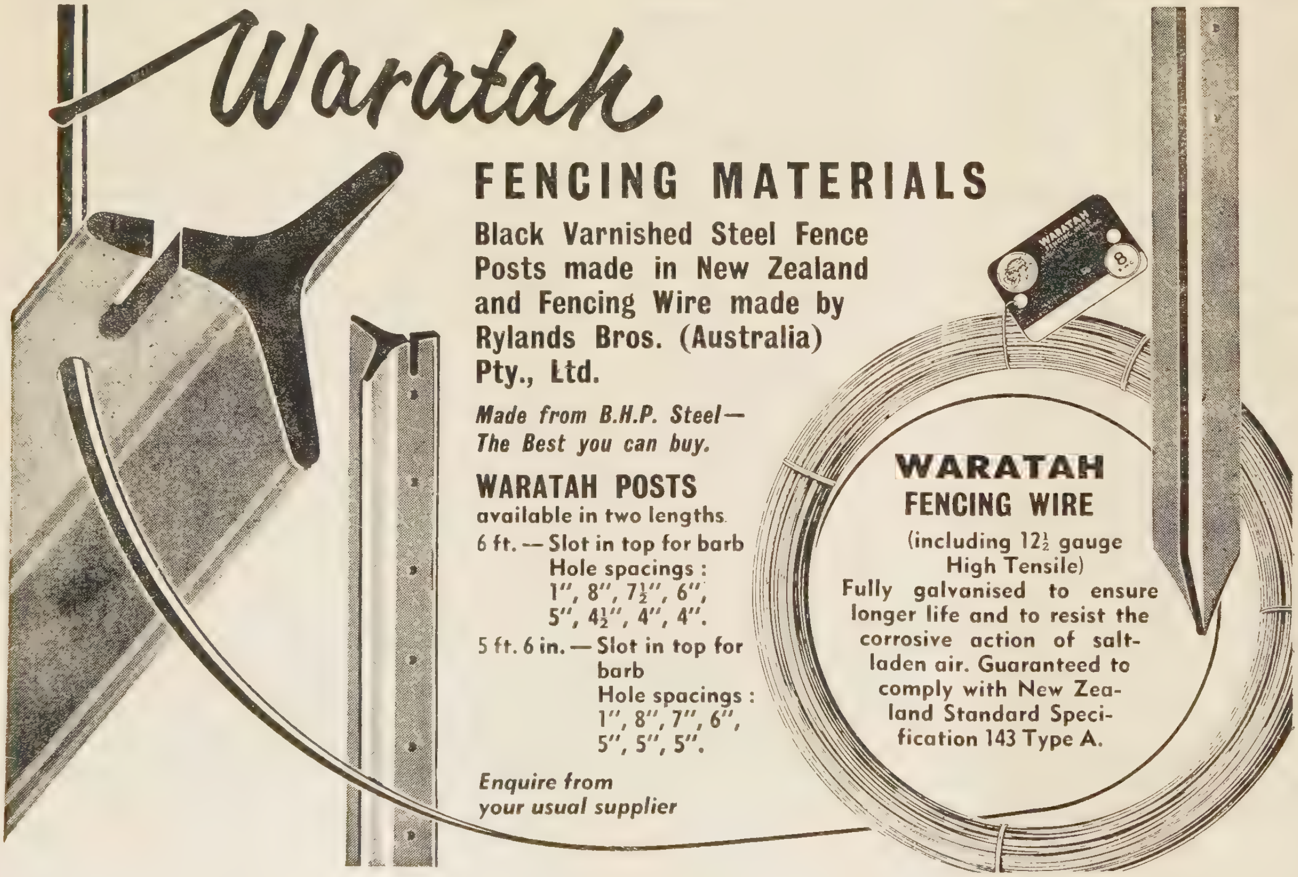
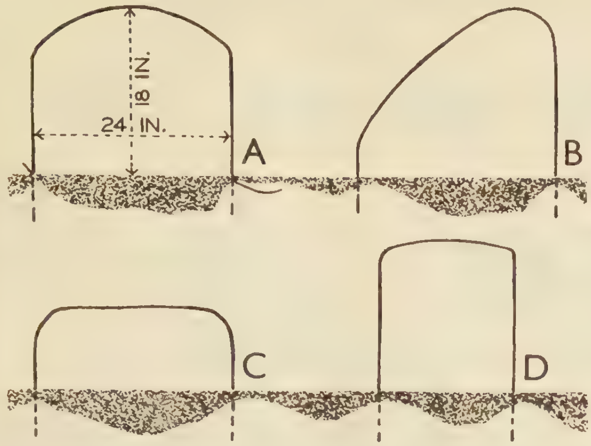
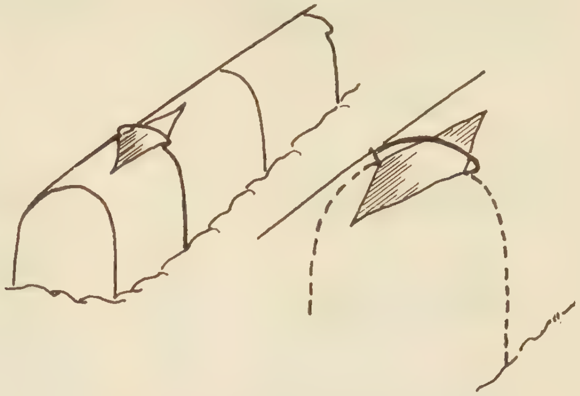


COVERING CROPS WITH PLASTIC SUPPORTED WITH No. 8 WIRE HOOPS

(Hoops should be at least 6 in. in ground)



A—Plastic should be buried on one side, but clipped down on the other to give access or ventilation. B—Wire bent so that hoop is sited toward sun. C—Wire support for plastic for low crops. D—Wire support for plastic for tall crops.



Ventilation can be provided by bending alternate wire hoops as shown, slitting the plastic, and pulling it out into the bends in the wire.

Cloches and Frames

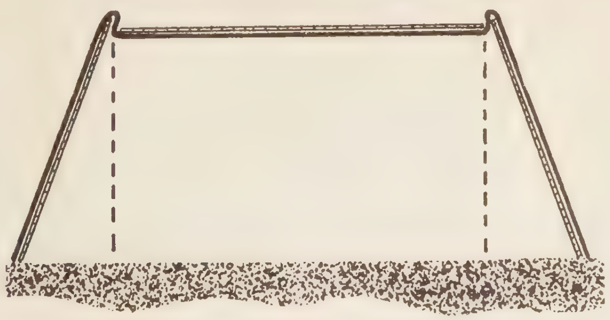
Cloches and frames have only limited uses in New Zealand because in most of the main vegetable growing districts there are areas not subject to late frosts, well sited to the sun, and free from the coldest winds where early crops can be grown more cheaply and efficiently than under frames or cloches.

Frames are used largely for propagation. Vegetable growers raise cabbage, cauliflower, lettuce, and celery plants under them and use them for protecting tomato seedlings. For growers who are not much concerned with raising plants frames are usually simply made of planks nailed together to form large shallow square or rectangular boxes, which are covered with sacking on frosty nights.

However, cloches and frames can be used to advance the growth of crops, and many types of cloches are available.

Modern cloches, which may be of glass, plastic, or similar material provide continuous protection of plants in the row, and are therefore usually referred to as continuous cloches. The tent pattern consists of two sheets of glass held firmly by a metal clip or block of wood or simple but effective system of wiring. The barn type is made up of four sheets of glass, usually held rigidly by wires, the lower two sheets forming walls and the upper two a gable roof. The flat-roof type consists of three sheets of glass, one for each side and one for the roof.

Cross section of flat-topped cloche showing how rain falls (dotted lines) within it. With cloches of the barn or tent type drills have to be opened along the sides to facilitate watering.



Ventilation of barn types is usually provided at the top by steps in the wire which holds the cloche together so that a pane or two panes may be moved apart to allow air movement into the cloche.

One type of cloche does not suit all crops. With the barn or tent type watering can be irksome, though certain crops under them are less likely to rot due to water dripping on them or close to them. With the flat-topped cloche rain falls within the cloche. This is an advantage in some circumstances; another advantage is the economy in glass which is possible, as adjacent rows can be interlocked and glass from middle walls dispensed with.

Cloches of plastic, acrylic resin, or similar material are available. They are less readily broken than glass cloches, and some experimental work seems to indicate that for light transmission some types may have slight advantages over glass cloches, though for most types this is not so.

Some advantages and disadvantages of cloches are:

Advantages

Maintenance of higher soil and air temperature and humidity.

Protection against several degrees of frost and from wind.

Protection against washing of the soil by rain, particularly for young seedlings.

Protective sprays are not washed off by rain.

Plants under them are protected from most birds and small animals.

Disadvantages

Cost: Unless great care is taken, particularly with glass cloches, breakages may be heavy. (Growers must be alert and careful when moving cloches and working, particularly hoeing, round them. Feet should be placed with care. Tools such as shovels, forks, and spades should not be stood in the ground near them, where they may be knocked or fall over on to the glass. Stones, bricks, heavy clods, hoes, and rakes should not be left lying near cloches, where they may be kicked or pushed against

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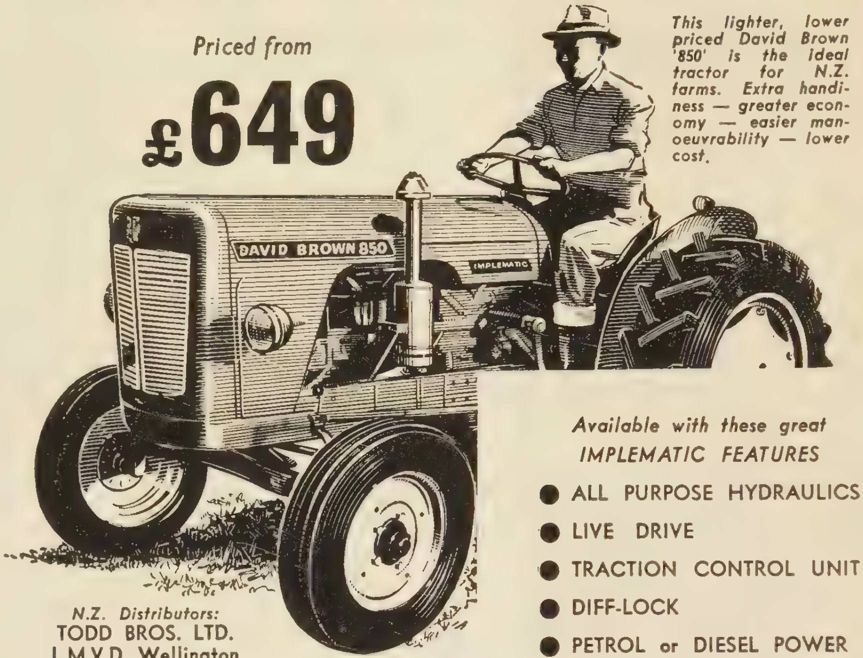

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the glass. If cloches are to be stored, they should be dismantled unless they can be put in a place where they are unlikely to be damaged.)

Cultural operations, such as thinning, weeding, spraying, and watering, are usually more difficult under cloches than in the open.

Insect pests and some diseases are liable to be more troublesome in cloches, though this is largely a result of the improved growing conditions, such as increased humidity and temperature.

July Work in the Home Garden

By A. G. KENNELLY

TEMPERATURES govern the sowing of hardy vegetables in July. Even in the milder parts of New Zealand it is not usually advisable to make large sowings. Small sowings will ensure the continuity of supply of fresh vegetables so important in home production.

IN July small sowings of such comparatively hardy plants as broad beans, silver beet or perpetual spinach beet, peas, spinach, turnips, and even carrots and radish may be made where climate and soil conditions are favourable. Lettuce and summer cabbage and cauliflower can be sown, though in less favoured districts a frame or specially favourable situation is advisable. If cloches are used, all the seed mentioned can be sown in well drained soil, but cloches should be in position about a week before sowing.

Hardy plants (horse radish, spring cabbage, kohl rabi, garlic, and shallots), and in North Island districts onion seedlings can be set out as soon as the soil is in good working condition. Where the weather is not too severe lettuce and cauliflower can also be set out, preferably late in the month in most districts.

Rhubarb and asparagus beds should be cultivated and manured. Where drainage is good and conditions are warm enough to enable the plants to respond, liquid manure can be applied to the soil.

If soil conditions permit, the ground can be prepared for new beds of rhubarb or asparagus. Deep digging is desirable on most heavy or fine-grained soil, as it improves drainage and aeration, which are especially important in the production of early vegetables.

When the weather does not permit working on the soil the home gardener should take the opportunity to attend to odd jobs for which there is not always time in the busier seasons. Paths and drains can be installed or improved, and rock, brick, concrete, or even wooden edgings and steps can be built where needed or where they improve the amenities or appearance of the garden. Woody trash can be burnt and other garden residue composted.

SOWING AND PLANTING IN BRIEF

SOW

Broad beans, spinach.

Small sowings can also be made under cloches, in frames, or in the open, where conditions are favourable of cabbages and cauliflowers (for late spring or early summer), carrots, lettuce, peas, onions for salad use, silver beet or perpetual spinach beet, turnips.

PLANT

Where soil conditions and temperatures are favourable plant or make preparations for planting: asparagus and rhubarb crowns, horse radish, shallots, garlic, onions, cabbages, cauliflowers, lettuces, kohl rabi, potatoes (in especially early areas).

[*Green and Hahn*

Only small sowings should be made in July, and these only if soil conditions are favourable.

Soil and used seed boxes can be sterilised with a 2 per cent formalin solution, tools can be sharpened and cleaned, and bins, shelves, garden seats, trellises, and benches can be built or repaired. Cloches can be cleaned, repaired, or reassembled.

Winter or early spring, when much ground is being dug over or is vacant, is a good time to apply lime. Rains usual at this time of year can be expected to wash in the lime before the soil is again cropped.

Plans can be made for the forthcoming season's crops, special consideration being given to ensuring that each crop is succeeded by one of another family. The gardener should plan as far as possible to avoid growing too much of any one crop or to have more of his garden occupied by a certain crop than he can afford. Only varieties proved by local experience to be most suitable should be used.

Asparagus

New beds of asparagus are usually planted in August or in some southern districts in September, but where the ground is reasonably dry it is possible to plant in July. Single rows should be at least 48 in. apart and the plants about 18 in. to 24 in. apart in the rows.

The site should first be dug deeply and if necessary drainage improved by open material such as shingle or stones buried deeply in trenches, or by field pipes leading down to a lower level where excess water can drain away. All perennial weeds and grasses should be destroyed and material such as well rotted stable or farmyard manure, compost, or rotted strawy vegetation dug into the bottom spit.

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Broad Beans

It is not too late to sow broad beans. If a first sowing was made in autumn, a sowing made now will give a succession. They do not need special soil, but should not be sown in light soils which tend to dry out. Broad beans prefer a fairly heavy, well drained soil that has been well cultivated and into which has been dug a moderate amount of organic matter such as compost or well rotted farmyard manure.

Heavy soil should be deeply dug, preferably some time before sowing. Though a small amount of potash is often beneficial, particularly on light soils or where disease is troublesome, the principal nutrient required on most New Zealand soils is phosphate. A dressing of 2 to 4 oz of superphosphate per square yard should suffice. In addition a small amount of nitrogenous fertiliser (sulphate of ammonia or dried blood) may be advisable in old, well worked home gardens lacking organic matter and low in fertility.

Seed should be sown in double rows about 10 in. apart with the seed placed diagonally 4 to 6 in. apart and 2 in. deep in the bottom of a shallow trench or drill 3 in. deep. Germination is usually good.

The main varieties are represented by types such as Broad Windsor and Mammoth Long Pod, but more recently strains of Spanish origin have given good results and dwarf types having smaller beans (for example, the Sutton) are useful in exposed situations.

Cabbage, Cauliflowers, Lettuces

Cabbage, cauliflower, and lettuce seed can be sown to give plants for late spring or early summer. The seedbed should be in a sunny sheltered situation. Soil should be well cultivated, weed free, and moderately enriched with a balanced fertiliser such as 5 parts of blood and bone and 1 part of sulphate of potash applied at 1 to 2 oz to the square yard.

Onions

In districts where it is customary to sow the main onion crop in autumn, plants can be set out 3 to 4 in. apart in rows 12 in. apart if conditions are favourable. In most southern districts the main crop is sown in September, but in favourably situated gardens where soil conditions are good a small early sowing may be made toward the end of the month.

The onion bed should be thoroughly cultivated and preferably manured in autumn with well rotted stable or

Freedom-from-Hunger Campaign

ON range lands in semi-arid climates scarcity and unreliability of rainfall frequently produce catastrophic losses among livestock. Information from various countries indicates that these emergency periods come as frequently as once every three or four years, losses amounting to as much as half the total stock.

Illustrated is a flock of Barbary ewes being inspected by a Food and Agriculture Organization expert at a sheep breeding centre established by FAO in Libya.

Active participation of farmers and villagers in such projects is encouraged as an incentive to primitive farmers to adopt more efficient techniques.

The confidence of the people must be won before projects can advance, as farmers at a bare subsistence level cannot afford to take risks with new methods the results from which they do not know.

Much loss of stock could be avoided in such semi-arid areas, Freedom-from-Hunger Campaign authorities believe, if as little as one-tenth of the available pastures were set aside for use only in drought years. These reserves could be enriched by reseeding or planting of special fodder species. Such reserves of pasture would also, by showing the results of deferred grazing, do much to educate the nomadic population in rational range management.

farmyard manure. Onions require a firm bed and the soil should be fine and crumbly and the drainage good. Though the onion bed should be firm, it should not be consolidated so that a crust is formed, as the root system of the onion is limited in size and comparatively weak. The amount of firming will, therefore, vary according to whether the soil is light or heavy or is inclined to be dry or fairly moist. Light, dry soil can be consolidated by treading, usually with a shuffling walk; heavy soil, especially if it tends to be wet, requires very little firming. Rain usually soon settles it sufficiently.

Where there is insufficient organic manure a dressing of bonedust at 3 oz to the square yard and of superphosphate at 2 oz to the square yard can be forked lightly into the soil surface. The addition of potash at about 1 oz to the square yard should prove beneficial on many soils.

Onion seed should be sown thinly ½ in. deep in rows 12 in. apart. Half an ounce of seed should sow about 100 ft of row.

Peas

If the weather is favourable, an early sowing of peas may be made in well drained soil that preferably should be medium to light. Though peas do well in cool, but not cold, weather, losses due to soil-borne diseases are common with early sowings. These diseases are favoured by the inability of the seed or young plants to make immediate vigorous growth in cold, wet soil, which often is all that is available for early sowing.

Peas for early sowing should be dressed with a seed dust such as thiram, which can be obtained from most seedsmen. Peas repay good cultural methods, and the ground should be deeply dug and of good humus content.

Seed should be covered about 1 in. and for later sowings preferably set about 2 in. deep in a shallow drill. In very light soils seed can be sown a little deeper, but for early sowing when the ground is cold, shallow planting is preferable. Seed can be sown as single rows in narrow drills or as band rows in which the seed is zig-zagged 2 to 3 in. apart. Rows should be 20 to 36 in. apart according to the height of the variety.

William Massey and Little Marvel are popular early varieties. One pound of seed is enough to plant about 100 ft of row.

Potatoes

Stored potatoes should be sorted over to eliminate rotten ones. Where the tuber moth is likely to be troublesome DDT should be dusted over stored potatoes at ¾ lb of 1 per cent dust per large sack. Tuber moth larvae or grubs usually work at first just under the skin, later tunnelling through the tubers, which causes damage that may later lead to decay.

The moth, which is seldom seen during the day unless disturbed, is generally grey, with forewings more or less spotted and mottled and hind wings narrower than the forewings and buff. The wing-spread is a little more than ½ in.

Regular picking over of potatoes in store is very important, for under favourable circumstances the development of tuber moths may continue throughout the year. Though the eggs, which are minute, white, and glistening, are easily recognised, and may be deposited in batches of up to 30 in the eye or on any rough scar on a potato, the first stages of infestation after the eggs have hatched are often rather difficult to detect, as the entrance hole is very small and is webbed over. Later pinkness can usually be detected around the injured eye and excrement can be seen held in the web at the entrance of the burrow.

Where tuber moth infestation is likely potatoes stored loosely on a shed floor can be protected by being kept covered with a closely woven material and examined regularly for infestation.

Planting

Though it is much too early in most districts to plant main-crop potatoes, a few tubers can be planted in warm, sheltered situations where there is very little frost or they can be set to sprout. Even where frost is fairly heavy some potatoes may be grown if the home gardener is prepared to keep top growth covered.

Soil for early potatoes should be well drained and should work freely. Even where it is not intended to plant for some time seed of early potatoes can be set in trays in a light, airy, frost-free situation to green and sprout. Tubers set out for sprouting and greening before planting can be protected against insect damage by dusting with DDT.

Rhubarb

Established rhubarb beds should be dressed with manure if this has not already been done. Where a new rhubarb bed is to be made the old crowns should be examined. If the buds are starting to grow, the crowns should be split with a sharp spade and pieces with one or two buds replanted about 30 in. apart each way.

As rhubarb usually remains in one part of the garden for several years, new beds should be thoroughly prepared. They should be adequately drained and manured and all portions of very troublesome weeds such as convolvulus, couch, or oxalis must be removed. A liberal dressing of well rotted farmyard manure or compost or, failing this, blood and bone should be applied.

Rhubarb is easy to force. An early variety should be chosen and covered with a fairly large box or some straw to exclude frost and retain any available heat. Forced rhubarb has less development of the leaf blade than unforced and the stalks are sweeter and more tender.

Spinach

Spinach is one of the hardier vegetables that can be sown throughout winter where the seedlings can establish without danger of being lifted by frost. However, a well drained and well worked soil is needed, and for quick growth essential to the production of good produce soil should contain plenty of well rotted organic manure.

Bulk Grain Drying Methods in United Kingdom to be Studied

BULK grain drying methods and machinery developments generally will be studied by Mr C. J. Crosbie, Farm Advisory Officer (Machinery), Department of Agriculture, Christchurch, during a six weeks' visit to the United Kingdom. He will leave New Zealand by air in late July.

In recent years bulk harvesting of grain has developed rapidly in New Zealand and is replacing bagging methods. Satisfactory results with bulk harvesting can often depend on reducing the moisture content of grain after its delivery into storage bins.

Mr Crosbie has made a special study of bulk grain drying during the last three years and in the February issue of the "Journal" published the first detailed account of the application of the system under New Zealand conditions. Mr Crosbie is also well known for his field work and articles on tractor safety. He wrote the original script of the film "We Lead the World", which in 1959 won an award of merit at the Chicago festival of safety films.

Layout of Chute Woolsheds

SHED capacities, woolrooms, and plans for 2-, 3-, and 4-stand chute woolsheds are discussed in this second article by D. G. AUSTIN, Sheep and Wool Instructor, Department of Agriculture, Auckland. The first article, which appeared in the April issue, dealt with the advantages of the chute woolshed layout.

Sheep Capacity of Shed

HOLDING-PEN and night-pen sizes and shapes were discussed in an article in the August 1955 "Journal".

Where sheds are on two levels, there must be enough sheep on the top floor behind the board for the longest run, which is a two-hour one, except where gang labour and farm or station staff move sheep up or forward continually so that the supply is uninterrupted.

Table 1 gives calculations of sheep capacities and the holding area needed at varying shearing speeds. The areas shown allow 15 per cent for space taken up by walls and pen divisions. Sheep space overnight is 4 sq. ft. for Romneys and 3 sq. ft. for half-breds.

Size of Catching Pens

The size of catching pens is governed by speed of the shearers, availability of labour, and size of sheep.

Small pens obviously require constant attention with medium-paced shearers; with fast shearers very small pens are a positive disadvantage.

Fleecos can manage the penning up in the slower small sheds. In faster sheds with more stands a man is necessary to do this as well as other sheep work; it should not be left to the woolroom staff. It is not uncommon to find **table hands** leaving their work to help in the pens, with results to the skirting and rolling that can well be imagined.

It is better to hold more sheep per catching pen where faster shearers are employed or where there are more stands. Even if the shearer has to go an extra foot or so for his sheep, it is for only part of the time.

Larger catching pens should be considered where labour is not available, even though shearers prefer small pens.

Counting-out pens may be partly under the shed for extra shelter. It would be easy to roof these pens.

Table 2 shows how often different sized pens must be filled for shearers of varying speeds. A Romney sheep occupies about 3 sq. ft. in a catching pen 6 ft by 8 ft. Where four shearers average 250 sheep per day each, pens holding 16 sheep will have to be refilled at an average rate of one every nine minutes.

TABLE 1—AREA REQUIRED TO HOLD SHEEP FOR ONE TWO-HOUR RUN (sq. ft.)

	Shearers' average tally per day											
	Two stands				Three stands				Four stands			
	100	150	200	250	100	150	200	250	100	150	200	250
North Island (9-hour day)												
No. of sheep ..	44	67	89	111	67	100	133	167	89	133	178	222
Area @ 4 sq. ft. ..	202	308	409	521	308	460	613	768	409	613	819	1,021
Area @ 3 sq. ft. ..	152	231	307	383	231	345	460	576	307	460	614	766
South Island (8-hour day)												
No. of sheep ..	50	75	100		75	112	150		100	150	200	
Area @ 4 sq. ft. ..	230	345	460		345	515	690		460	690	920	
Area @ 3 sq. ft. ..	201	259	345		249	386	518		345	518	690	

Examples: A shearer and learner turn out 250 and 150 per day. They would need 89 sheep, for which 409 sq. ft. should be provided. Four shearers averaging 250 sheep per day would need 222 sheep. One thousand sq. ft. can be provided to hold them on the top floor or labour must be available to restock the top pens from below or outside during the run.

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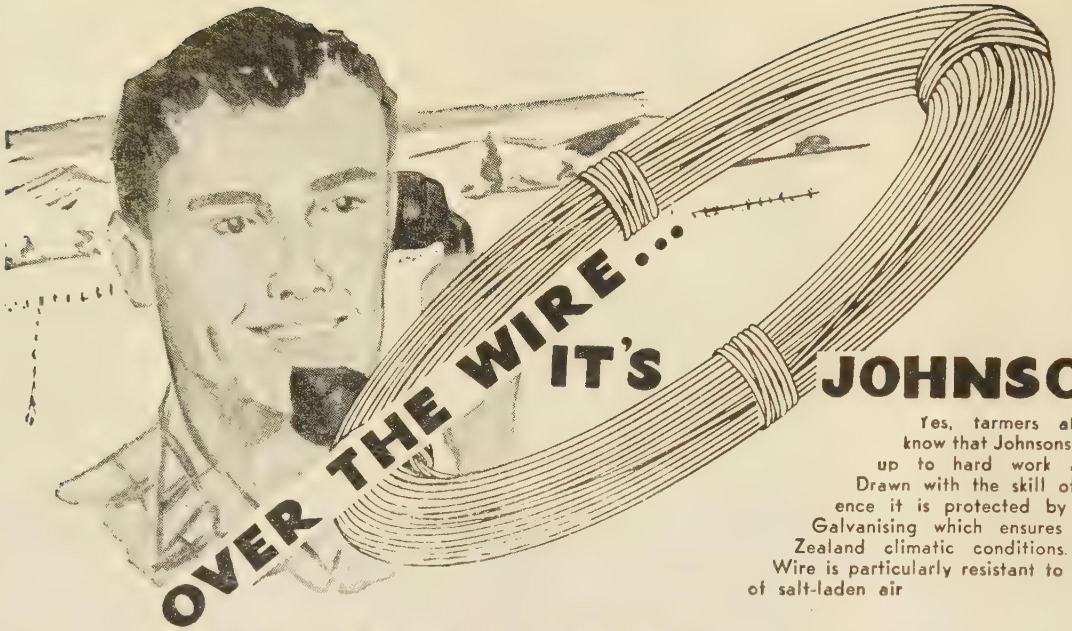

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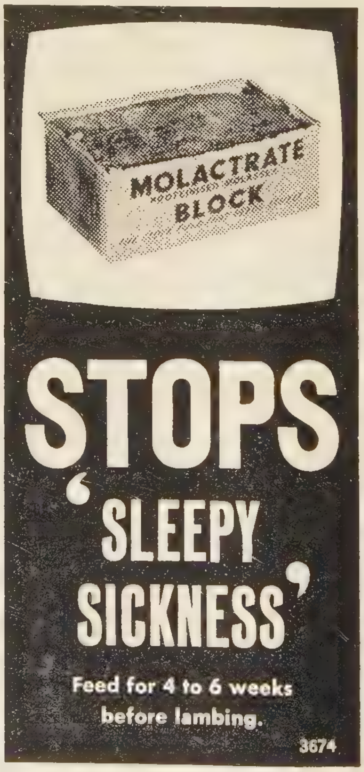

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Woolroom

The woolroom, though the board faces it, is basically operated as in other types of woolshed. Requirements are minimum distances for staff and wool to travel and adequate light.

The shortest route for the wool from the board to table, bins, and press and for bales to storage and exit is the ideal and can be achieved in the woolroom of a chute woolshed without interference between the normal working movements of shedhand and shearer.

Working space in the woolroom must not be cramped. The basis of judgment is the working room left when the area is at peak capacity. Important factors are:

Where labour is limited extra woolroom space is needed; whether fleeces are skirted or not; the requirements of containers for oddments until they are pressed; the number and size of fleece bins, especially if a large clip is to be classed in the shed; the type of wool press; and the number of bales to be stacked awaiting cartage.

Woolroom sizes over very many workable sheds average: 2-stand sheds, 240 to 260 sq. ft. per shearer; 3-stand sheds, 220 to 250 sq. ft. per shearer; 4-stand sheds, 200 to 230 sq. ft. per shearer.

Space is allowed for standard equipment, average to fast shearers, and storage of bales for 1½ to 2 days' shearing.

To some extent the size of the wool table governs the size and shape of the woolroom. In the chute woolshed it controls the length of the woolroom from board to end wall. Should fleece bins be placed between the end of the table and the wall, additional length is necessary.

It is a mistake to cut down the area of a woolroom to the extent that the table must be made smaller. It then becomes inadequate to handle full crossbred fleeces. The inconvenience of lack of working space may be barely noticed with only one shearer, but it becomes intensified as the number of shearers and their speed increases.

Standard Equipment

The wool table* (minimum 8 ft 6 in. x 4 ft 6 in.) is placed with one end close to the middle shearer or perhaps slightly nearer the faster man on No. 1 (usually the left-hand) stand. It is not against a wall and so allows access to both sides for easy skirting and better thrown out fleeces. The size of the table is important as is the working space round it. Very large fleeces may require a table up to 10 ft long.

TABLE 2—FREQUENCY OF REFILLING CATCHING PENS (Mins.)

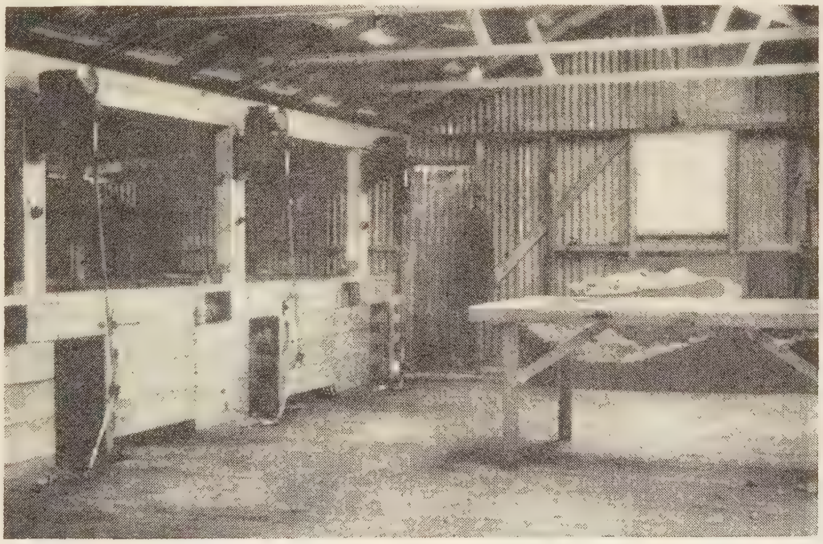
	Sheep in each pen																	
Shearer's tally	Two stand						Three stand						Four stand					
	10	12	14	16	18	20	10	12	14	16	18	20	10	12	14	16	18	20
North Island (9-hour day)																		
100	27	32	38	43	49	54	18	22	25	29	32	36	14	16	19	22	24	27
150	18	22	25	29	32	36	12	14	17	19	22	24	9	11	13	14	16	18
200	14	16	19	22	24	27	9	11	13	14	16	18	7	8	9	11	12	14
250	11	13	15	17	19	22	7	9	10	12	13	14	5	7	8	9	10	11
300	9	11	13	14	16	18	6	7	8	10	11	12	5	5	6	7	8	9
350	8	9	11	12	14	15	5	6	7	8	9	10	4	5	5	6	7	8
South Island (8-hour day)																		
100	24	29	34	38	43	48	16	19	22	26	29	32	12	14	17	19	22	24
150	16	19	22	26	29	32	11	13	15	17	19	21	8	10	11	13	14	16
200	12	14	17	19	22	24	8	10	11	13	14	16	6	7	8	10	11	12
250	10	12	13	15	17	19	6	8	9	10	12	13	5	6	7	8	9	10

Examples (pens 6 ft x 8 ft): (A) With two North Island shearers averaging 150 a day a catching pen must be filled every 29 minutes. (B) At 300 a day a pen has to be filled every 14 minutes. (C) Four shearers averaging 300 a day cut out a catching pen at an average of every seven minutes. If it takes about 1½ to 2 minutes to fill a pen (and this can be longer, particularly if sheep are not kept up), penning up will take the percentage of a man's time as follows in the examples quoted: (A) 7, (B) 14, and (C) 28.

Fixed fleece bins may be 3 ft 6 in. x 3 ft 6in. x 7 ft high and should be so placed that wool may be rolled to the corner of the table nearest the bin. They must be handy to the wool press position. Bins this size will hold about 1¼ bales of wool.

Bins* for fleece wool may be on castors or fixed to a wall by hinges to swing out of the way when not required.

Pieces, necks, and bellies may be handled conveniently by using woolpacks set up with internal frames* or merely hung from wall or rafters. Woolpacks have the advantage that they are readily available. These containers for oddments should be spaced



The large working area and well lighted board help to ensure efficiency in this shed.

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* See "New Zealand Journal of Agriculture", volume 95, p. 333.

* See "New Zealand Journal of Agriculture", volume 91, p. 275.

* See "New Zealand Journal of Agriculture", volume 93, p. 490.

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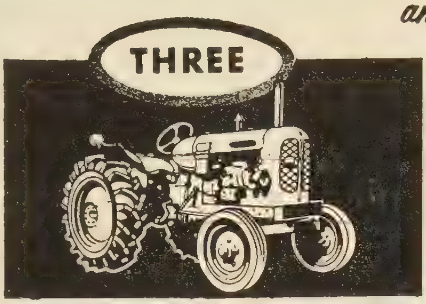

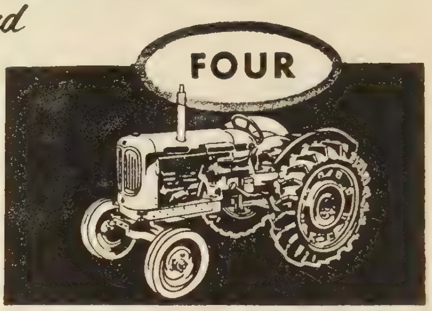

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about the table and board to be as near as possible to the wool they are to hold. They are easy to move to the press for baling.

Filled fadges can be stacked in columns against the wall, simple wall hooks being used to secure them. Large fixed bins for oddments are less useful because the wool they contain must be taken to the press slowly in armfuls with the need for cleaning up later.

Bale storage occupies space usually on the west side and north-west corner of the woolroom where good lighting is least required. The bales are handiest to the main door and the wool press.

Lighting for Woolroom and Board

As the board in the chute woolshed is not along the outside wall, it may seem difficult to provide satisfactory lighting, but light is admitted from windows and skylights.

Windows are placed along the easterly wall, one at the end of the board and two further along to serve the wool table. The windows should be at least 2 ft wide x 4 ft high, the height allowing light to penetrate to the back of the room. Other windows should be installed to light the press, bins, and grinder space. The first three windows serve the board fairly well, because the shearer faces these windows 80 per cent of the time. The glass louvre type of window, though dearer than plain types, gives ventilation when required and for the amateur builder is easiest to install.

The skylights may be above the front edge of the board and table and above the catching pens. By being so placed they reduce all dark shadows thrown by the wall windows and give good diffused illumination. In the 4-stand woolshed at least two skylights are necessary to serve the much longer board. Translucent rather than clear skylights reduce glare.

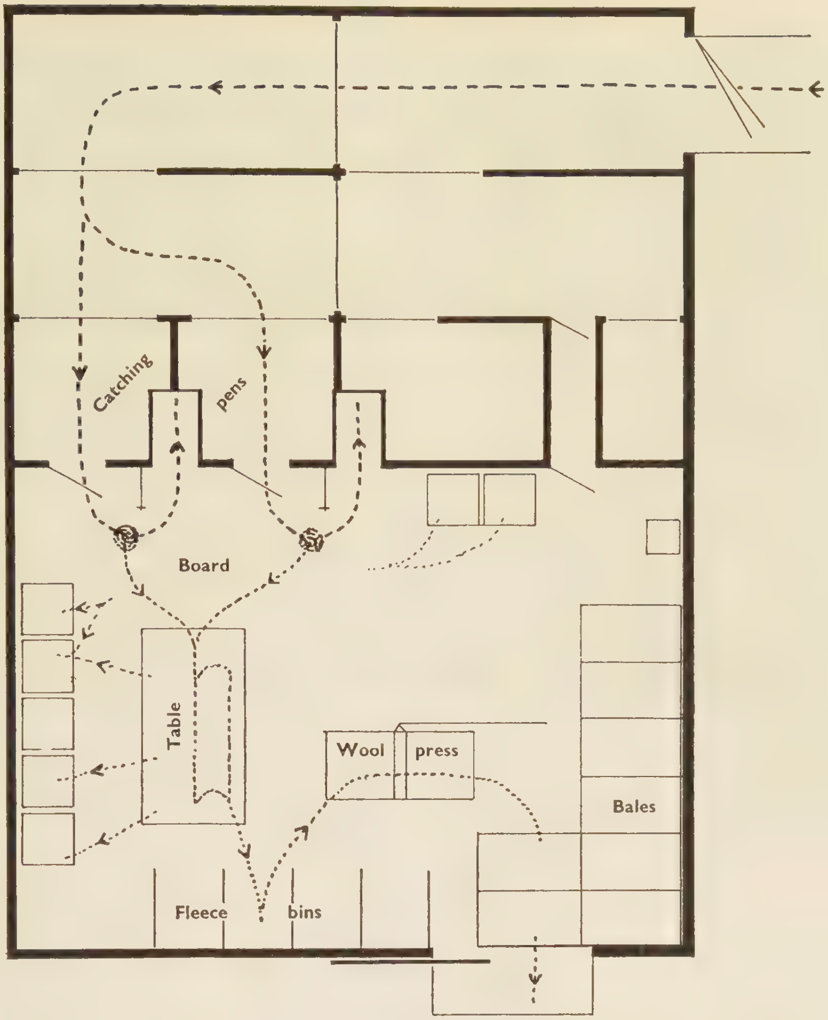
In the woolroom light must be bright and diffused and not glaring, especially if the clip is classed in the shed. Aids to correct lighting are the painting of the inside of the woolroom white to give maximum reflection and the use of light calico blinds over clear skylights to prevent direct sunlight.

Position of Skylight

The position of the skylight should be determined when the rafters are in place but before covering in the roof. A piece of hardboard (the size of the skylight) placed on the rafters throws a shadow where the skylight's direct light would strike.

In this way, no matter what the shed orientation is, shadow-fall can be checked to avoid board and wool table, and the final skylight will produce the same effect.

LAYOUT OF CHUTE WOOLSHEDS



Dotted lines show passage of sheep and wool through shed. Point to point distances are the shortest possible and working room is left round all equipment.

Allowance should be made for variation of the sun's height between summer and winter.

Stud Height of Woolroom

As the machines do not have to be installed on an outside wall, the stud does not have to be more than 8 ft high. It can be 7 ft 6 in., especially where independent electric motors are used, still leaving ample room for servicing. On the other hand a greater stud height means usually cooler working conditions.

Night-pen Capacity

To save space and roof area it is a good plan to have night pens below the woolroom, and as building costs are high, the more dual-purpose facilities that can be included the better.

The pens have battened floors, usually prefabricated in sections, so that they can be removed easily for the ground below to be cleaned. There should be at least 1 ft 6 in. clearance between ground level and the battens.

A guide to head clearance in the night pens below the woolroom is the amount of sheep work to be done below the woolroom. A 4-stand shed with a larger woolroom requires greater height, whereas a minimum clearance may be sufficient in a smaller 2-stand shed.

Pens below the woolroom can be used in the off-season as storage space if sufficient working height is allowed, but it is unwise to stack fertiliser in them since a batten floor is designed for a relatively light loading. Night pens should be well ventilated with wall louvres at intervals or by blocking out one or two weatherboards to

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give a louvre running the length of the wall. Stable-door type entrances also assist ventilation.

Electric lighting in the night pens helps in filling the shed after dark. As in the siting of windows, lights must be placed at points suitable for drawing the sheep into the shed.

Wet-weather access from the lower night pens to the top floor is by a ramp 3 ft or 4 ft wide; in fine weather the sheep are usually brought up through the sheepyards.

Counting-out Pens

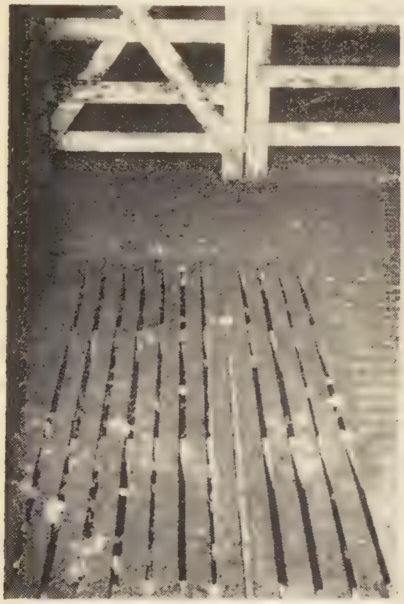
Counting-out pens may be built outside the shed, partly under the end of the shed, or beneath the night pens on the top floor of the shed.

In the second position and especially in the third more clearance from ground to top floor level is required. If pens are placed below gratings, some type of sloping roof is worth while to keep the sheep and the pens clean. This can be simply made of matchlining or sheet metal and is easily cleaned with a swan-neck hoe or home-made scraper.

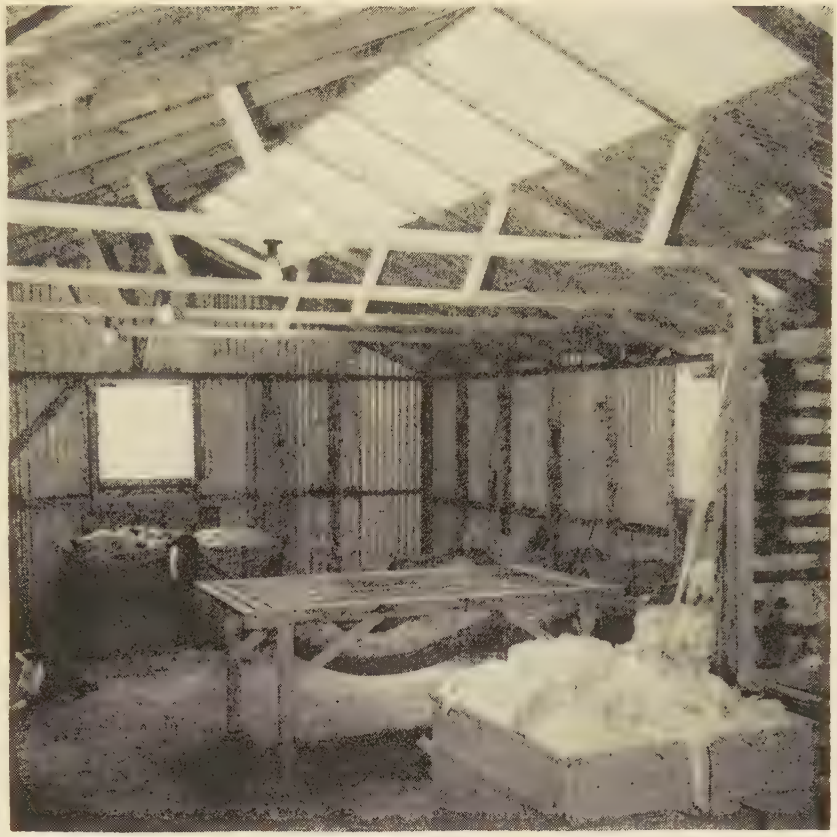
When pens are outside it is well worth while to have a low roof built over them, particularly when the flock is to be winter shorn.

Selected Woolshed Plans

The floor plan illustrated is for a 2-stand woolshed, but the same principles apply to those for the 3- and 4-stand sheds. The floor plans described may be obtained through Sheep and Wool Instructors in main centres or from the Department of Agriculture, Wellington and Auckland.



Battens in catching pens can run in either direction, or in the composite way shown.



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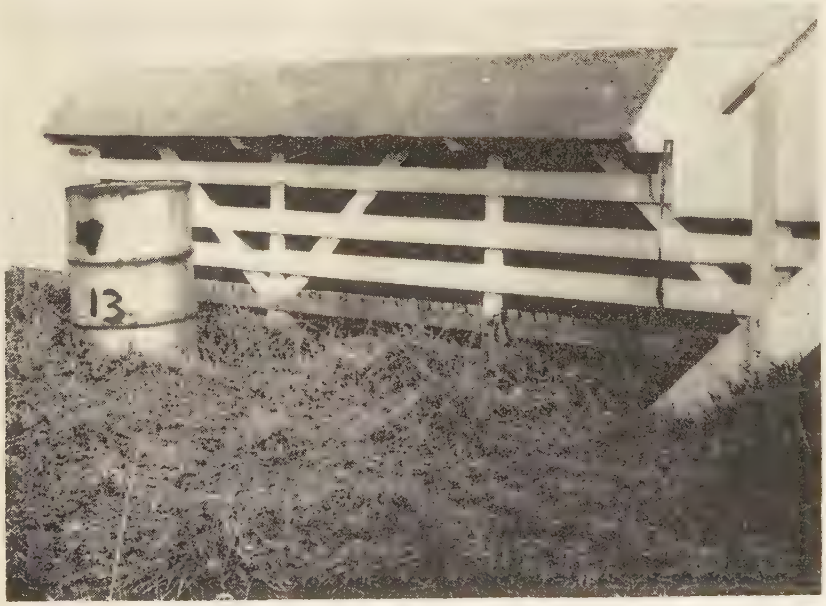

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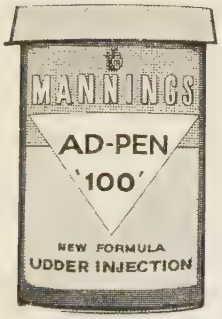

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Any quarters which show signs of mastitis at drying-off and those which have shown infection during the season should be given three tubes of Adpen 100,000 strength at 24 hour intervals, the last tube after the final milking as the cow is finally turned out.

MANNINGS LTD. of HAMILTON — Veterinary Chemists

The Importance Of Care In Drying Off

It has been estimated that mastitis accounts for more than 50 per cent of the total losses brought about by dairy cow diseases and this figure in £. s. d. is astronomical.

The preventive measures to combat this disease require a rigid system of shed hygiene, examination of pre-milk from each quarter for any abnormality and prompt use of penicillin at the required dosage.

Unfortunately the bacteria associated with mastitis may appear in the milk some time before exhibiting any symptoms apparent to the naked eye. It could therefore quite easily result in a cow being a carrier of the disease without the milker being aware of it.

When the time comes for drying off the herd it is a matter of good animal husbandry to consider every cow as a suspect carrier of mastitis and a wise precaution after the last milking would be to inject penicillin cream into each quarter before turning them out. It should be understood that the penicillin remains concentrated in the udder for a much longer period than is the case with lactating animals.

The economics of this precaution are elementary. The cost of the penicillin required to treat all of an average size herd could be adequately covered if a quarter from one cow was saved during the next lactation. It is sound economy, therefore, to look ahead. Ensure that your herd comes in free of mastitis next season by injecting every quarter with Ad-pen penicillin plus as your cows are turned out.

* AD-PEN IS PENICILLIN PLUS: It is an improved combination of penicillin and a powerful anti-bacteria agent. This combination is effective against a much wider range of bacteria than penicillin alone, and is also effective against many cases of stephylococcal mastitis, which are resistant to the ordinary penicillin treatment

Size

The size of building is considered a minimum to operate with medium to fast shearers. The woolroom equipment is accordingly drawn to scale to show just how little waste space there will be when the shed is at maximum capacity. Full fadges held for baling not shown. Space must be reserved for stacking them, especially when change-overs from shearing ewes to lambs and vice versa are likely to occur. Experience recommends that where a shed is likely to be understaffed the woolroom should be increased in size.

Sheep Holding Capacity

Each shed provides for enough sheep on the top floor for the longest run at average to fast shearing speeds. Pens will be constructed below the woolroom floor for more than half the sheep held overnight or the equivalent extra building area must be provided.

Roof Layout

In the 2- and 3-stand plans the roof may be fully gabled with a lengthwise ridge. Alternatively with a stud height of over 9 ft the gable roof may cover the woolroom and catching pens with the ridge across the shed. The extra height of stud allows sufficient fall for a lean-to roof to cover the holding pens. In the 4-stand shed this system of gable is preferred, since trusses to span more than 30 ft are costly.

Ramp

Access by ramp from the lower floor should be left open above. This makes sheep work much easier and the ramp is better lit. If a ramp is not installed, sheep may be transferred between floors via the sheepyards.

Entrances

Sheep entrances may be on either side of the shed to suit the sheepyards.

The Stage

The position of the stage may be adjusted about the end and west wall to suit ground contour and access.

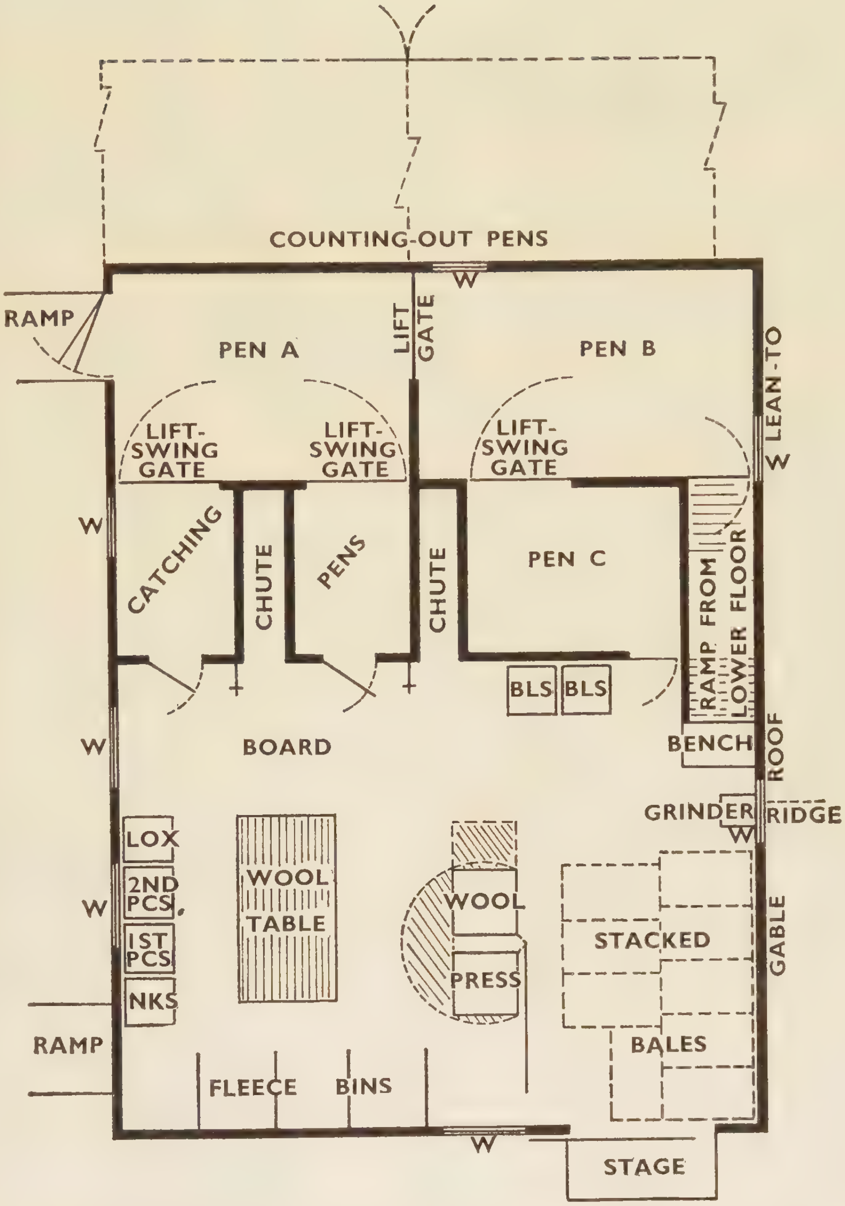
Lower Pens

The outside walls of the lower pens do not need to be fully covered in except for the prevailing weather side and may be railed only as for sheep pens. The lower pens require a batten floor where woolly sheep are to be held. Working heights from the battens to the floor joists above may vary from 4 ft to 6 ft according to preference, the size of the area to be worked, the suitability of the ground contour, and cost.

Foundations

The position of foundation blocks requires careful consideration to avoid chutes and to have jackstuds as supports under pen walls and to suit by-laws.

LAYOUT OF CHUTE WOOLSHEDS



Plan of 2-stand chute woolshed. Floor plans for 2-, 3-, and 4-stand sheds may be obtained through Sheep and Wool Instructors in main centres or from the Department of Agriculture, Wellington and Auckland.

Woolroom

The woolroom end of the shed usually faces a northerly direction to give the best all-day lighting. Equipment is of the standard type, for which plans are available. Floor loading in the shed is no more than is required for housing (40 to 50 lb per sq. ft.) except where bales may be stacked in three tiers (100 to 120 lb per sq. ft.).

2-stand Plan

Dimensions: Length 40 ft, width 30 ft, area 1,200 sq. ft. Woolroom and board

CUT-OUT TIME FOR TWO SHEARERS AT AVERAGE SHEARING TALLIES (in hours and minutes)

	9-hour day			8-hour day		
	150	200	250	100	150	200
Sheep on top floor ..	3.20	2.30	2.0	4.26	2.58	2.13
All sheep in shed ..	7.54	5.55	4.44	10.30	7.01	5.15

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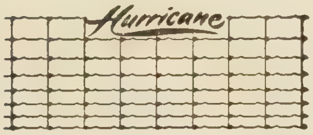

Medium Weight Fences (Pig and sheep fences, etc.): **From 25/2 to 33/- per chain.**

Light Weight Fences (Utility, electric, docking, etc.): **From 18/3 to 33/9 per chain.**

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area per stand, 312 sq. ft. Bales stacked in three tiers, 27; on end, 18 to 20. Sheep on upper floor, 111; lower floor, 152. Total sheep in the shed, 263 Romneys.

Chutes are continued as races to outside counting-out pens and may be uncovered and railed off between the catching pens (reduced draught on the board, but smaller pens) or may be covered in. The covers may be constructed in the corners of their respective pens, or, better, No. 1 chute centred in the pen division and No. 2 chute wholly in pen C.

3-stand Plan

Dimensions: Length 50 ft, width 30 ft, area 1,500 sq. ft. Woolroom and board area per stand, 225 sq. ft. Bales stacked in three tiers, 36; on end, 20 to 24. Sheep on upper floor, 162; lower floor, 157. Total sheep in the shed, 319 Romneys.

Chutes may be continued as races to outside counting-out pens behind the shed or, by turning the races, at the side of the shed. In the latter case sharp turns immediately at the bottom of the chute are dangerous, and to give more room at this point chutes should not be made steeper than the grades recommended. The top of the chutes is better railed off rather than covered in. to allow more light on the chute itself, less draught through the porthole, and to leave the pens free from odd corners and obstructions.

4-stand Shed

Dimensions: Length 45 ft, width 45 ft, area 2,025 sq. ft. Woolroom and board area per stand, 232 sq. ft. Bales stacked in three tiers, 42; on end, 28 to 30. Sheep on upper floor, 226; lower floor, 223. Total sheep in the shed, 449 Romneys.

Chutes may be continued as races to outside counting-out pens behind the shed or be constructed below the sheep pens. Where they are below the sheep pens a light roof to reduce undue fouling from the pens above can be installed. This also enables the counting-out pens to be used as extra night pens for woolly sheep, and would require them to be floored with gratings.

Woolroom

One table can be used. With fast shearers (280 to 320 per day) two tables can be used end on to the board. Fadges for bellies, lox, and 2nd pieces would be duplicated at each end of the board and fadges for skirtings placed between the tables.

Lighting

Skylighting is especially necessary in the 4-stand shed to augment the light from the windows for both board and woolroom and for the sheep pen area. Skylights should be installed mainly in the south-facing side of the roof.

CUT-OUT TIME FOR THREE SHEARERS AT AVERAGE SHEARING TALLIES (in hours and minutes)

	9-hour day			8-hour day		
	150	200	250	100	150	200
Sheep on top floor ..	3.14	2.26	1.57	4.19	2.53	2.10
All sheep in shed ..	6.23	4.47	3.50	8.30	5.40	4.15

CUT-OUT TIME FOR FOUR SHEARERS AT AVERAGE SHEARING TALLIES (in hours and minutes)

	9-hour day			8-hour day		
	150	200	250	100	150	200
Sheep on top floor ..	3.20	2.30	2.02	4.30	3.01	2.15
All sheep in shed ..	6.44	5.03	4.03	8.58	5.59	4.29

Pedigree Pig Improvement Scheme: Qualified Litters

By the Animal Industry Division

THE following table sets out particulars of litter performance, growth-rate, and carcass quality points for those litters which have qualified in the Pedigree Pig Improvement Scheme for publication since those appearing in the August 1960 issue of the "Journal".

Owner	Breeding of litter		Date born	Litter weight at 3 weeks	Dead weight	Growth rate	Carcass test results (average) points									Total points
	Sire	Dam					Length	Back fat Shoulder	Back fat Loin	Bal.	Ham	Sh.	L.	B.	M.	
				lb	lb	(25)	(20)	(10)	(20)	(5)	(15)	(10)	(10)	(5)	(5)	(125)
Class A Baconers																
V. Hinton	LW 14799	LW 14794	19/1/60	119	122	20	10½	9+	20	3½	8	7½	6½	3½	3	91½
N.Z. Pig Pro. Council	LW 16162	LW 14782	14/11/59	100	135	11	15½	9+	17—	5	10	7	6	5	2	87½
N.Z. Pig Pro. Council	LW 16568	LW 14492	9/1/60	84	149	23	10	8—	15—	2½	12	7½	6	4	5	93
N.Z. Pig Pro. Council	B 32644	B 32647	29/12/59	109	136	14	16½	7+	15—	2	10	7	8½	5	4	89
N.Z. Pig Pro. Council	LW 16580	LW 15446	25/3/60	118	130	10	19	9+	16±	5	9½	6½	7	5	3½	90½
N.Z. Pig Pro. Council	LW 17119	LW 14759	25/5/60	97	139	21	15½	9½+	12—	5	11	6½	8	4½	5	98
N.Z. Pig Pro. Council	B 32644	B 31326	9/1/60	103	113	9½	14	7+	15½—	5	10½	7	7½	5	7	88
N.Z. Pig Pro. Council	B 32651	B 33119	27/5/60	113	147	11	16½	8+	19+	3	12	6	7	5	4	91½
Class B Baconers																
N.Z. Pig Pro. Council	LW 16580	LW 14904	23/3/60	83	134	11½	17	7½—	13½—	5	10	6½	6	5	3½	85½
Class A Porkers																
							Maximum points (15)								(10)	
N.Z. Pig Pro. Council	B 32651	B 33118	30/10/59	89	70	13	17	7+	9—	4½	10½	7½	7½	4½	10	90½
C. P. Clout	LW 16164	LW 16562	28/12/59	115	83	10	15½	10	13½—	5	11½	4½	6½	3½	9	89
R. V. McGregor ..	B 32422	B 33252	9/3/60	105	68	19½	13½	7½+	13½—	5	8½	6	6½	4½	9	93½
R. V. McGregor ..	B 32422	B 33250	21/12/60	95	86	22	18	6½+	14+	5	6½	8	7½	5	7	99½
R. A. Baker	LW 16348	LW 16341	1/6/60	103	89	13½	20	9—	3—	5	11	7	7	5	7	87½
H. J. Hurford and Son	LW 16262	LW 16900	29/6/60	133	72	20	20	7½+	12½+	2½	10½	6½	8	5	10	102½
L. M. and R. J. Harper	LW 13581	LW 12607	29/7/60	129	87	22	16½	6—	10½—	5	8	7½	6	4½	10	96
B. G. and W. D. Dron	B 33690	B 32041	20/9/60	113	73	13½	15½	8+	12—	4½	10	9	9	5	10	96½
B. G. and W. D. Dron	B 33690	B 32602	6/10/60	121	73	22½	18	8+	14+	5	10	6	8	4	10	105½
B. G. and W. D. Dron	B 33690	B 32601	8/10/60	124	73	22½	15½	9½+	13½+	4½	11½	5½	7	4	10	103½
C. I. Wright	LW 13590	LW 14336	9/9/60	137	97	18½	16½	1+	10+	5	11½	6	7	5	7½	88
C. I. Wright	LW 17017	LW 16065	7/11/60	124	74	17	14	8½+	12—	5	10½	8	7½	4	7½	94
Class C Porkers																
N.Z. Pig Pro. Council	LW 16173	LW 14834	24/11/59	86	90	15½	17½	4+	13+	5	11½	7½	7½	5	10	96½
N.Z. Pig Pro. Council	LW 16167	LW 14236	18/11/59	90	89	11½	16	5—	9½+	5	12	7	7½	5	10	88½
C. I. Wright	LW 13590	LW 15799	12/12/60	91.5	75	11	15	5½+	13+	5	12	6½	8½	5	8½	90

+ Points lost because too much fat. — Too little fat. L. Loin development. B. Belly thickness. M. Marketing points.

Death of Expert Who Helped to Provide Reliable Farm Seeds

MR N. R. FOY, a former officer of the Department of Agriculture who during his 30 years' service did much to assist farmers to obtain reliable seeds, has died in London. When he resigned from the Department in 1947 Mr Foy had been in charge of the Seed-Testing Station for over 20 years.

Impure seed, poor-quality seed, and quite commonly seed with both defects were among the hazards in land development about the time Mr Foy began his seed-testing work. By instruction, such as the many articles he wrote for the "Journal", and development of seed-testing services Mr Foy helped substantially to reduce failures due to faulty seed.

Mr N. R. Foy.

The ultra-violet light method of identifying strains of ryegrass and the picric acid test for differentiating clovers were adopted under his direction. He was largely responsible for building up the Seed-Testing Station's reputation among seed merchants and farmers and was in charge during the vital period when seed certification of the major pasture and crop seeds came into prominence.

Mr Foy left the Department of Agriculture to join a commercial organisation, which he was representing in London when he died. His brother Mr H. A. Foy is Director of the Dairy Division.

Meteorological Records for April

Station	Height of station above M.S.L. (ft)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	240	61.6	+0.6	77.2	43.2	4.47	19	—0.4	1.45	27	118
Auckland	160	61.8	+0.5	74.5	46.9	3.83	10	—0.5	1.39	27	162
Tauranga	12	57.8	+0.7	75.6	39.7	4.79	9	—0.2	2.92	27	197
Ruakura	131	57.4	+0.8	75.2	33.2	3.32	11	—0.7	0.79	27	171
Whakarewarewa ..	1,006	55.0	+0.0	71.7	34.5	4.74	8	—0.2	3.47	27	166
Gisborne	14	57.8	—0.1	78.0	38.0	2.02	12	—1.4	0.44	10	167
New Plymouth ..	160	57.4	—0.7	68.2	39.8	3.93	11	—1.1	1.05	16	164
Karioi	2,125	50.4	+0.0	73.0	29.9	3.97	8	+0.1	0.98	27	—
Napier	5	57.4	—1.1	81.1	39.4	2.47	15	—0.2	1.00	27	192
Wanganui	72	57.2	—0.3	78.1	34.8	3.85	8	+1.0	1.63	1	191
Palmerston North ..	110	57.0	+0.4	75.0	34.0	2.80	8	—0.5	1.27	1	163
Waingawa	340	54.1	—0.4	76.5	31.7	3.64	12	+0.9	0.97	1	158
Wellington	415	56.6	+0.5	68.2	40.7	2.01	8	—1.7	0.60	18	175
Nelson airfield ..	5	53.7	—0.4	72.1	34.8	1.55	8	—1.4	0.53	15	192
Blenheim	14	56.2	+0.7	77.1	35.3	0.39	4	—1.5	0.19	18	212
Hanmer Forest ..	1,270	52.0	+0.5	78.5	28.2	2.42	8	—1.0	0.79	18	171
Hokitika South ..	15	53.6	+0.7	65.0	35.1	7.93	15	—0.9	1.48	9	141
Christchurch ..	22	54.3	+0.8	86.2	34.1	0.67	5	—1.1	0.31	17	178
Ashburton	323	54.4	+1.8	87.2	29.4	2.05	8	—0.2	0.80	16	183
Timaru	56	54.3	+1.3	79.8	33.9	1.44	9	—0.4	0.55	17	167
Alexandra	520	50.9	—0.2	76.5	27.4	0.95	9	—0.3	0.32	25	160
Taieri	80	51.6	+0.3	78.8	29.3	2.56	12	+0.3	0.72	8	127
Invercargill airfield ..	0	50.6	+0.7	67.8	31.1	6.70	20	+2.9	1.57	17	77
Chatham Island ..	150	53.5	+0.4	63.9	42.9	2.11	14	+0.5	0.95	28	97

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during March 1961 and for the 9 months ended 31 March 1961 with comparative figures for the same month and the 9 months 1959-60 have been compiled by the Dairy Division of the Department of Agricuulture from figures supplied by divisional officers at the various grading ports:

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage inc. or dec.
March 1961	13,112	320	13,432	—
March 1960	13,891	286	14,177	—
Increase or decrease	—779	+34	—745	—5.254
9 months ended 31/3/61	152,389	2,783	155,172	—
9 months ended 31/3/60	147,505	2,645	150,150	—
Increase	+4,884	+138	+5,022	+3.345

Butter in store at 31 March 1961 was 37,271 tons

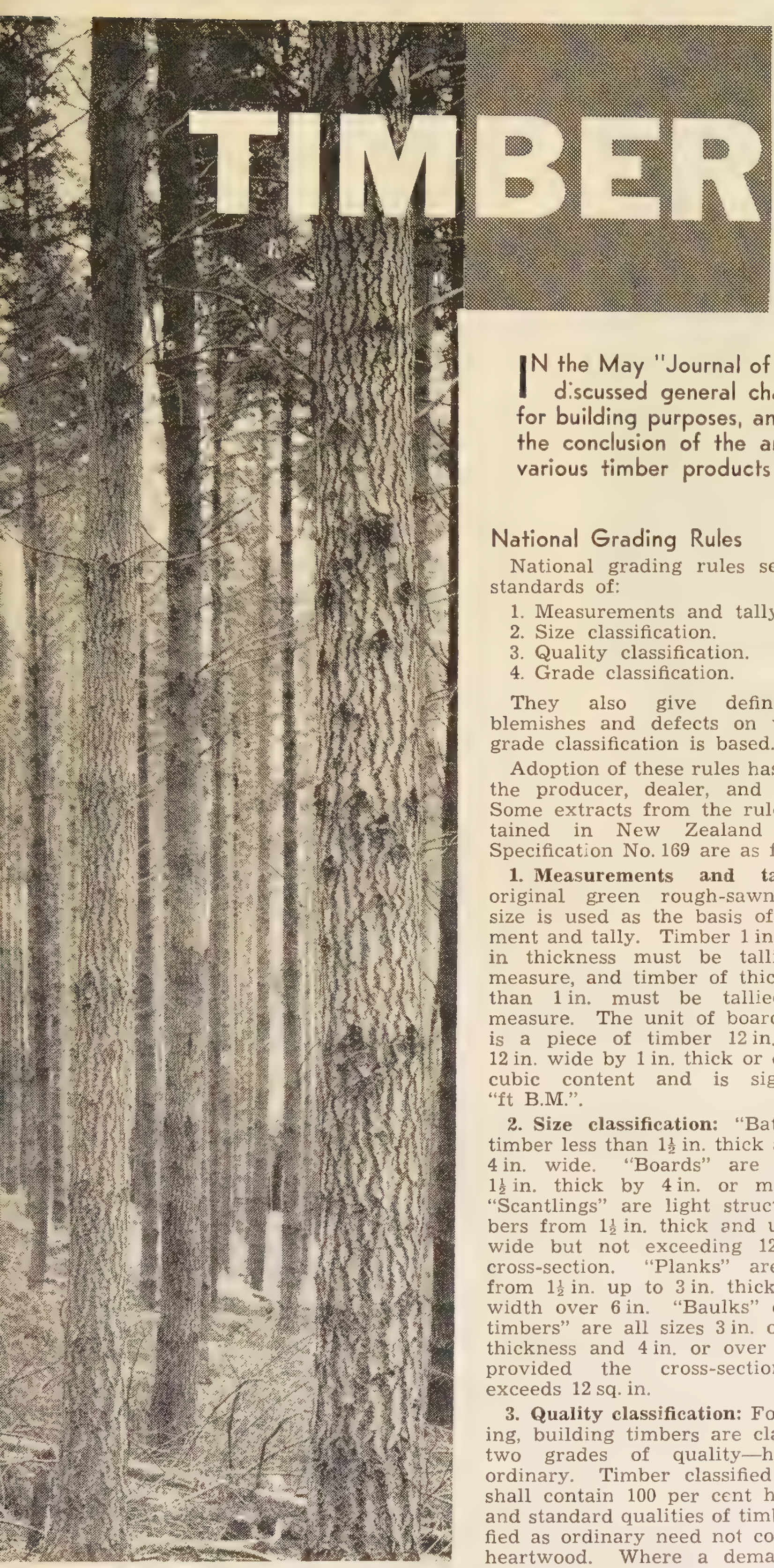
CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage increase
March 1961	7,342	2,036	9,378	—
March 1960	6,302	1,739	8,041	—
Increase	+1,040	+297	+1,337	+16.627
9 months ended 31/3/61	70,138	10,104	80,242	—
9 months ended 31/3/60	67,115	9,789	76,904	—
Increase	+3,023	+315	+3,338	+4.340

Cheese in store at 31 March 1961 was 26,553 tons

If these figures are converted into butterfat equivalent, there is an increase of 2.854 per cent in butterfat graded for the 9 months as compared with the preceding season. The above figures refer only to butter and cheese graded for export and do not include butter and cheese used on the local market and other products such as anhydrous milk fat, whole milk powder, and other whole milk products, and are not necessarily a true indication of production trends.

TIMBER



By H. W. T. EGGERS,
Engineer,
Department of Agriculture,
Wellington

IN the May "Journal of Agriculture" the author of this two-part article discussed general characteristics of timber, native timbers suitable for building purposes, and preservation and strength of timber. In this the conclusion of the article he deals with grading, shapes, and the various timber products resulting from modern processing methods.

National Grading Rules

National grading rules set out the standards of:

1. Measurements and tally.
2. Size classification.
3. Quality classification.
4. Grade classification.

They also give definitions of blemishes and defects on which the grade classification is based.

Adoption of these rules has benefited the producer, dealer, and consumer. Some extracts from the rules as contained in New Zealand Standard Specification No. 169 are as follows:

1. Measurements and tally: The original green rough-sawn nominal size is used as the basis of measurement and tally. Timber 1 in. and over in thickness must be tallied board measure, and timber of thickness less than 1 in. must be tallied surface measure. The unit of board measure is a piece of timber 12 in. long by 12 in. wide by 1 in. thick or equivalent cubic content and is signified as "ft B.M.".

2. Size classification: "Battens" are timber less than 1½ in. thick and under 4 in. wide. "Boards" are less than 1½ in. thick by 4 in. or more wide. "Scantlings" are light structural timbers from 1½ in. thick and up to 6 in. wide but not exceeding 12 sq. in. in cross-section. "Planks" are timbers from 1½ in. up to 3 in. thick and any width over 6 in. "Baulks" or "heavy timbers" are all sizes 3 in. or over in thickness and 4 in. or over in width, provided the cross-sectional area exceeds 12 sq. in.

3. Quality classification: For marketing, building timbers are classified in two grades of quality—heart and ordinary. Timber classified as heart shall contain 100 per cent heartwood, and standard qualities of timber classified as ordinary need not contain any heartwood. Where a demand exists for timber of intermediate quality the price list must make provision therefor and name such qualities according to the percentage of heart required; for example, 50 per cent heartwood or 75 per cent heartwood.

4. Grade classification: Under this classification building timbers are classed in two groups of standard grades, one for framing and the other for finishing. The names of the grades are:

Framing grades	Finishing grades
Building A	Clears
Building B	Dressing A
Commons	Dressing B

Dressing B is produced incidental to the sawing of clears, and dressing A and building B are produced incidental to the sawing of building A. Commons is a cull grade.

Radiata Pine Grades

The grade classification of radiata pine, which is somewhat different from that of the indigenous timbers, is as follows:

Framing Grades

No. 1 Framing, for use as bearing members.

No. 2 Framing, for use as non-bearing members.

These grades are subject to provisions regarding blemishes and defects, the permissible extent of which is clearly defined for each grade.

Machining Grade

Machining grade is subdivided into finishing grade and dressing grade. **Finishing grade** is sound sawn timber intended for machining on four sides, and the boards must conform to requirements in respect of the better face covering knots, surface checks, bow, crook, and cup. **Dressing grade** is sound sawn timber intended for machining on four sides into flooring and weatherboarding in widths up to and including 6 in. As for finishing grades this grade must

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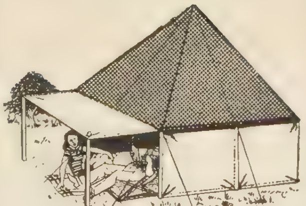

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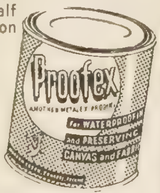
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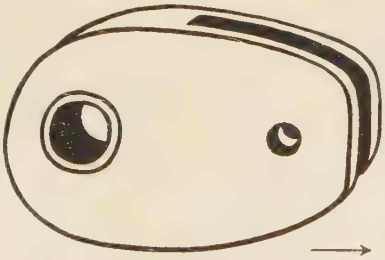

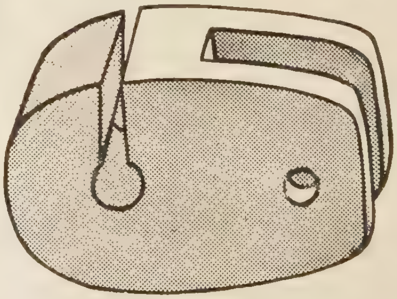

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conform to requirements covering knots, holes, resin and bark pockets, pith, wane, stain or discolouration, crook, bow, surface checks, and cup.

The grade into which timber is placed is decided by the number and type of blemishes and defects apparent in each piece. The National Grading Rules detail the number and type of blemishes and defects permitted in each grade and also closely define them. This permits a maximum uniformity of grading for a variable product such as timber.

Timber Shapes

Besides being available in sawn shapes as battens, boards, scantlings, planks, joists, and bulks, which are used for all general construction, timber is also machined into shapes for weatherboards, flooring, matchlining, mouldings, and joinery.

While timber can be readily machined into any shape desired, special shapes produced in small quantity would be expensive. To obtain some uniformity in the various profiles in which timber can be machined these profiles have been standardised.

New Zealand Standard Specification 495 defines profiles for weatherboards, flooring, and matchlining, and specification 496 defines profiles of mouldings and joinery. A few typical profiles are shown below.

These standard specifications ensure that profiles from any supplier will conform in shape and size.

Timber Products

Owing to its chemical composition timber is used as a raw material for the manufacture of other products such as paper, and modern industrial processing and combining of raw materials permit production of a variety of finished building materials.

Wallboards, plywoods, and particle board in various forms can be used to advantage where the characteristics of each form are best suited.

Some manufactured wood products with suggestions on use are listed here.

Softboard

Softboard is the term applied to sheathing material manufactured from wood pulp but not highly compressed in the process, the resultant board being relatively soft. These soft characteristics give the material high insulating value for both sound and temperature and is frequently referred to as insulating board.

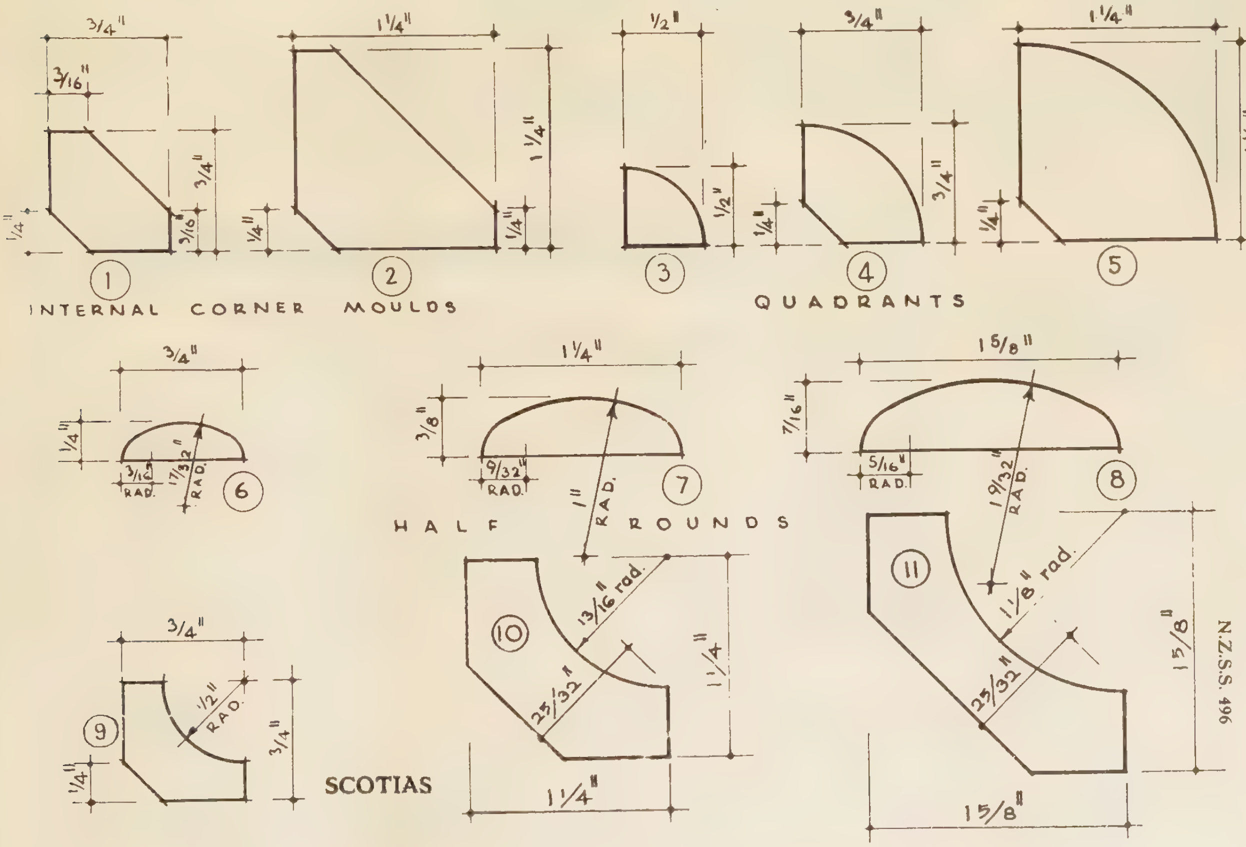
Resin and alum are added to raw timber pulp in a mixing vat; the pulp then passes to a forming machine which produces a continuous ribbon or mat of fibre. This is passed through a series of rollers to extract the water; then the board is cut and passed through a dryer, after which the sheets are trimmed to standard lengths and widths.

The finished board is ½ in. thick and available in multiple lengths from 6 ft to 10 ft and in widths of 4 ft or 4 ft 6 in.

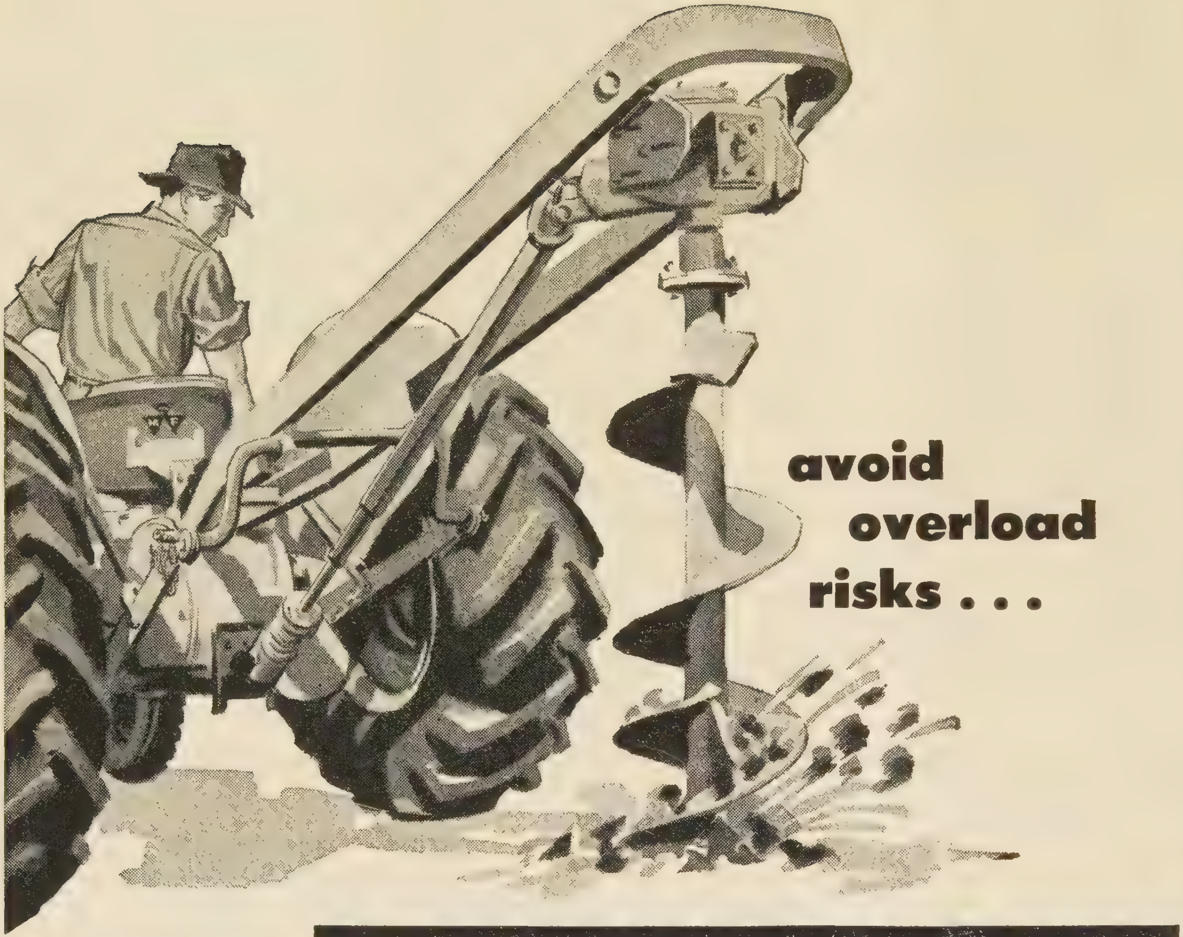
This board is also produced as planks or as tongued and grooved or bevel edged panels. The planks are ½ in. of ¾ in. thick, 12 in. wide and from 8 ft to 10 ft long, while the panels are ½ in. or ¾ in. thick, 12 in. wide, and from 1 ft to 4 ft long.

Softboard can be primed and colour finished as desired and its slightly stippled surface texture makes a pleasing finish. Planks and panels can be obtained colour finished in the factory, so requiring no further treatment after fixing.

This board is a versatile, low-cost lining suitable for either walls or ceilings where dampness is not a factor such as in bedrooms.

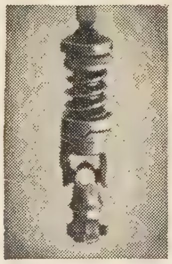


Examples of timber profiles to standard specifications of the New Zealand Standards Institute.



Hardy Spicer

SLIP CLUTCH SHAFT



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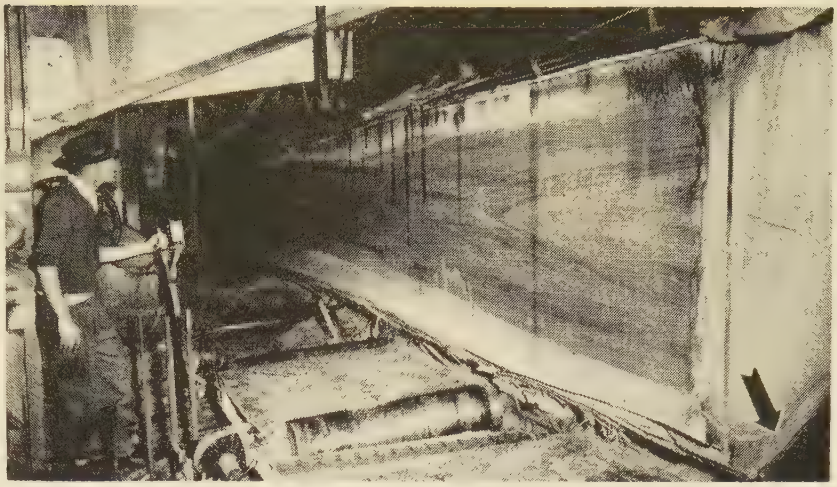


No useful structural size can be cut from the outer portion of a log under the bark (arrow). In plywood manufacture, however, this portion can be utilised, as the timber is peeled from the log in a thin, continuous ribbon or veneer.

Hardboard

The initial stages in the manufacture of hardboard are similar to those of softboard except that linseed oil is added at the liquid stage to give better adhesion of the fibres under the heat and pressure which are applied later. Board containing linseed oil for hardboard is thoroughly dried and then subjected to a high degree of heat and pressure which completely alters its texture, colour, and thickness.

If erected on framing when bone dry, the boards would absorb moisture and expand and buckle. To overcome this they are treated in a water bath so that the correct moisture content is achieved. This enables the board to adjust itself according to conditions of atmospheric humidity.

This material is available in sheets ⅛ in. to ¼ in. thick, 8 ft long, and 4 ft wide. It can be worked with woodworking tools in the same manner as timber and as normally produced is suitable for all internal sheathing.

It can be primed and painted to produce any finish required.

Variations in Finish

Both softboard and hardboard are further factory processed to make them more suitable for specific purposes.

Acoustic tiles: To enhance its sound-absorbing qualities softboard is drilled with a large number of small-diameter holes to two-thirds the thickness of the material. Acoustic tiles are available both in ½ in. and ¾ in. thickness, tongued and grooved or bevel edged. Sizes are 12 in. by 12 in. or 24 in. by 12 in.

Mouldings: The wood pulp used in the manufacture of softboard is also pressed into mouldings of various profiles for use as trim for interior lining.

Pegboard: Hardboard perforated similarly to softboard is supplied as pegboard, which is useful either for decorative purposes or for display or storage, as articles can be readily supported on hooks or pegs placed in the perforations. Double pegboard has twice the number of perforations per unit as plain peg board, and is being increasingly used as acoustic ceiling lining.

Tempered hardboard is the term applied to hardboard specially processed to make it moisture resistant for external use.

Leather board is hardboard moulded with an embossed pattern to give it the appearance of natural leather. It is available in a range of colours.

Decor board is hardboard grooved in a tile pattern of 4 in. squares and treated with a hard-wearing, high-gloss colour surface that makes it an ideal finished lining for bathrooms, kitchens, and laundries.

Hammer glaze is hardboard grooved in a large tile pattern of 8 in. or 12 in. squares and treated to obtain the effect of beaten metal under a smooth glossy surface. This material is supplied in various colours and is an excellent finished lining for places where linings are subject to steam, water, and possibly abrasion.

Chalk board is hardboard specially coated to provide a surface suitable for drawing or writing with chalks. This type of board is ideally suited for lining children's rooms, as its finish is decorative as well as useful. and it is used extensively by Education Boards.

Plywoods

Timber's natural disadvantages of not being absolutely stable or particularly strong can be removed by processing it into plywood, which is virtually the same as lamination, with the exception that plywood is produced in relatively thin sheets.

Because it is made up of an odd number of thin wood layers or plys, with the grain in one layer running counter to that in the next, plywood is much stronger than normal timber.

The process of manufacture in which the timber is peeled from the log in a thin, continuous ribbon or veneer also makes maximum use of the tree, as the cutting of bulks or planks always leaves a considerable proportion of waste. The illustration above shows the outer portion of the log under the bark from which no useful structural dimension can be cut.

Selected logs, after being immersed in boiling water until thoroughly soaked, are stripped of their bark down to the solid timber. Then the veneer is peeled off, inspected, and cut into usable sizes for plywood construction. These sizes are sorted and graded to make maximum use of raw material, and after being dried to a uniform moisture content are again graded and stocked ready for jointing to size. The veneer at this stage has little strength, but as manufacturing progresses the ply panels with their cross laminations take on considerable strength. The cross-grain construction makes the material strong, rigid, and puncture and split proof.

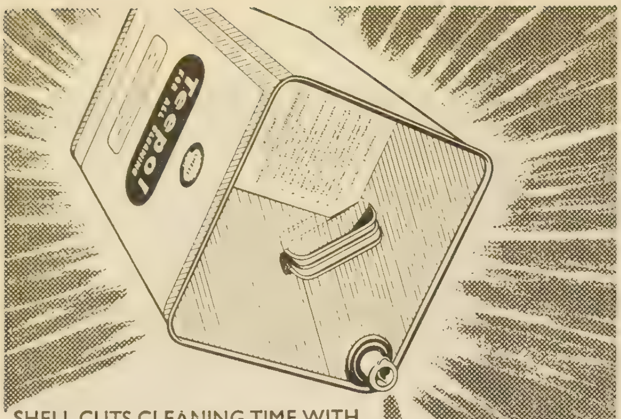
During the next phase of manufacture the plys are glued, assembled and pressed. The centre plys are glued on both sides and assembled with alternate dry plys to form 3, 5, or more ply panels. Several panels are then brought together and subjected to high pressure under heat.

The heat quickly dries or cures the glue according to the type used. Panels are then trimmed to size, sanded, checked, and graded and each sheet is stamped with the grade number and type, which may be Interior, Exterior, or Marine.

Plywoods for furniture and decorative panelling have surface veneers specially cut to obtain maximum beauty for the timber grain. This method of veneer cutting is called slice cutting. Slice cutting is an art needing much care in the initial cuts to reveal the best grain.

Timber with a grain which would be suitable for slice-cut veneer is shown at the top of page 567.

The principal difference between the types of plywood available is in the face veneers and bonding agents,



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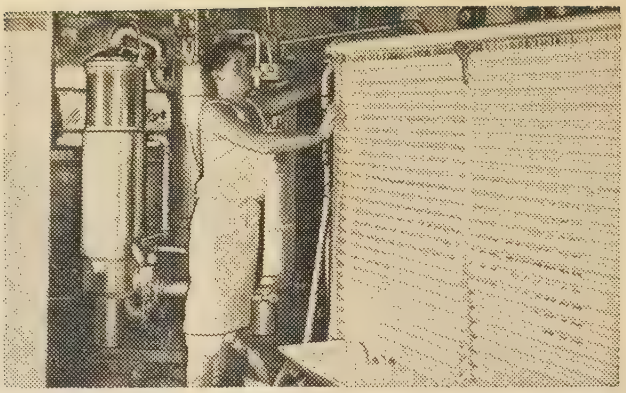

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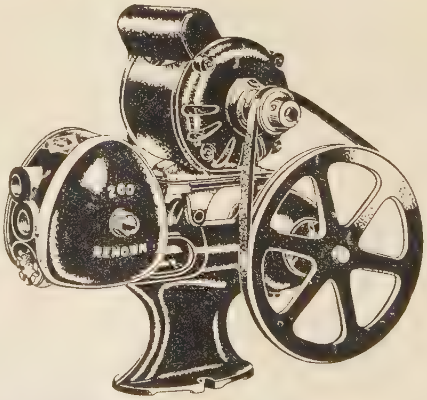

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The grain in this timber is suitable for slice-cut veneer.

a number of different adhesives being used to form the glue line.

Plywood for interior use is bonded with urea formaldehyde, which is water resistant. Plywood for exterior or marine use has a waterproof glue line of phenol formaldehyde which ensures non-separation of the plys. Where plywood is subjected in service to severe weather conditions or moisture it is always desirable to seal the edges with priming paint or a proprietary sealing compound to guard against moisture being absorbed into the dry veneers.

The purpose for which the ply will ultimately be used dictates the face veneers that will be used. Furniture that is to have a polished finish naturally requires a timber with beauty of grain. In the selection of face veneers for plywood for exterior use the timber's natural resistance to the conditions to be encountered must be considered.

New Zealand manufactured plywoods are rigidly graded in accordance with defined specifications used throughout the industry; this ensures that there is no variation in any specific line between the different manufacturers.

Locally manufactured plywood is available in the following woods:

Interior and exterior grades rotary cut: Pacific mahogany, rimu, matai, white pine, radiata pine.

Interior grade slice cut: Rimu, pink and light mahogany, satinwood.

Other kinds of imported veneers are also frequently available.

Grading for interior and exterior plywoods can be Heart Face, Selected

▼ The floor of this room is made of particle board sheets nailed directly to the joists.

[*Toms*

New Holland 404 Crusher maintain constant spring pressure to avoid overcrushing. Exclusive pickup height adjustmen brings throat opening closer to ground Hooks up to a New Holland 47 Mowe so you can mow and crush in one operation.

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New Holland 40 Crimper crimps stems neatly with smooth meshing action. Leaves a light, fluffy swath that dries quickly and evenly. Hooks up to a New Holland 47 Mower.

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For full information, contact Doring Implement Distributors, P.O. Box 1179, Wellington, C.1., New Zealand. New Holland Machine Company Division of Sperry Rand Corporation, New Holland, Pa.

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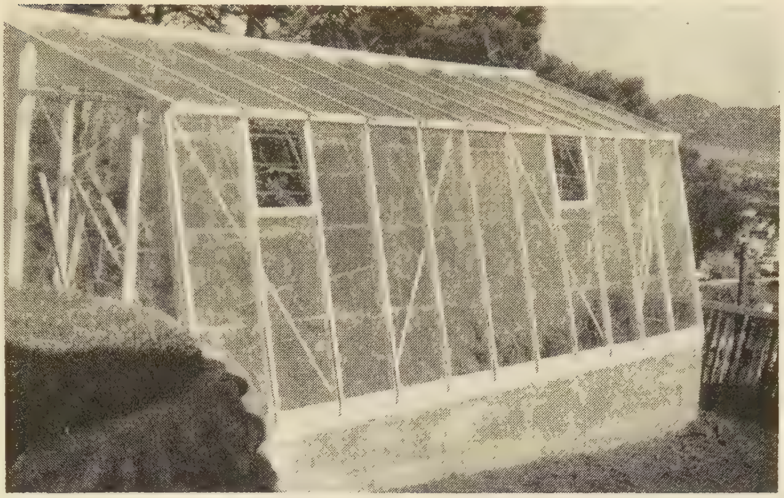
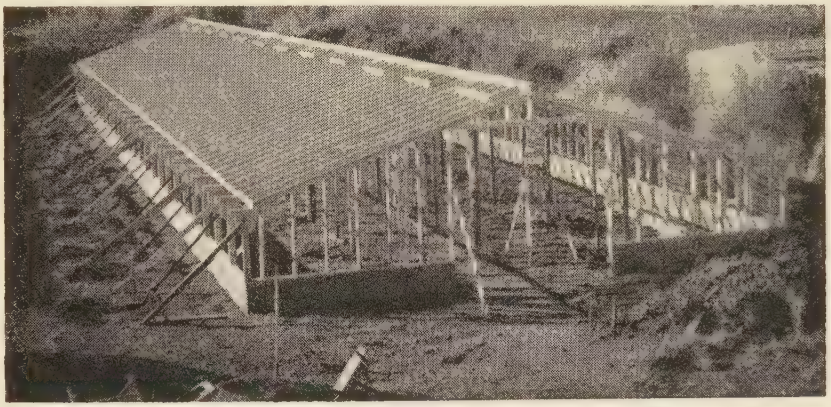




The frames of the domestic glasshouse (above) and the commercial glasshouse (below) are made of preservatised radiata pine.

No. 1, No. 1, or No. 2, while grading for interior slice cut can be either Select A or B.

Rotary cut plywood is available in sheets of various lengths from 3 ft to 8 ft in multiples of 1 ft. Sheets may be either 3 ft or 4 ft wide and from 3/16 in. to 11/10 in. thick. Some plywoods can also be obtained in millimetre thicknesses.

Interior slice cut plywoods are available in sheets 6 ft or 7 ft by 3ft by 3/16 in. or ¼ in. thick.

As with hardboard and softboard, plywood is also processed to produce variation of surface finish to add to its variety as a lining. It can be obtained with the surface textured with a grooved pattern cut to varying depths and widths which offers great scope for obtaining decorative panelling effects.

Plywood is also textured in a two-tone effect with an oriental type pattern. This is achieved by passing *Pinus radiata* or white pine ply sheets through hot rollers to produce an all-over relief pattern in a light toning standing out from a lightly scorched background. This material lends itself to decorative paint effects by what may be termed tricks of the painter's trade.

Combination of Materials

The combining of materials widens the range of versatility of a particular product.

Plywood and plastic combined produce a board with all the inherent strength and rigidity of plywood but with the smooth, split-free, waterproof characteristics of plastic.

Plastic-coated plywood is used for concrete form work to produce a surface finish which requires no further treatment. This means that the conventional method of plaster finish of rough concrete is no longer necessary. The same material is also used for sheathing where exposure is severe, such as for caravans or the hulls of boats.

Resin-bonded plywood can be used for interior lining and resin-bonded plastic-faced plywood for exterior sheathing, very smooth finishes being obtainable. Permanence can be ensured by edge sealing the material during construction.

Coreboard

Coreboard is another form of laminated timber which is not strictly plywood but rather a veneer-stressed panel. This material has good stability for veneering and is principally used in the furniture trade as a base stock.

Coreboard derives its name from its methods of construction. It is essentially a sandwich of ⅝ in. solid timber edge-glued in narrow strips and cross-bond veneered on both faces. The result is a material with practically no movement either with or across the grain of the face veneer.

Particle Board

Particle board is sheet material manufactured from wood particles rather than pulp as are softboard and hardboard.

Logs are shredded into an assortment of chips of various sizes and shapes, which after being coated with a resin-based adhesive are pressed into a homogeneous mass. After the glue has cured, the material produced is extremely strong and rigid. The natural texture and colouring of this board are pleasing and when it is treated with a clear finish it is very decorative for walls and floors.

The lower illustration on page 567 shows a dwellinghouse floor of particle board sheets nailed directly to the joists.

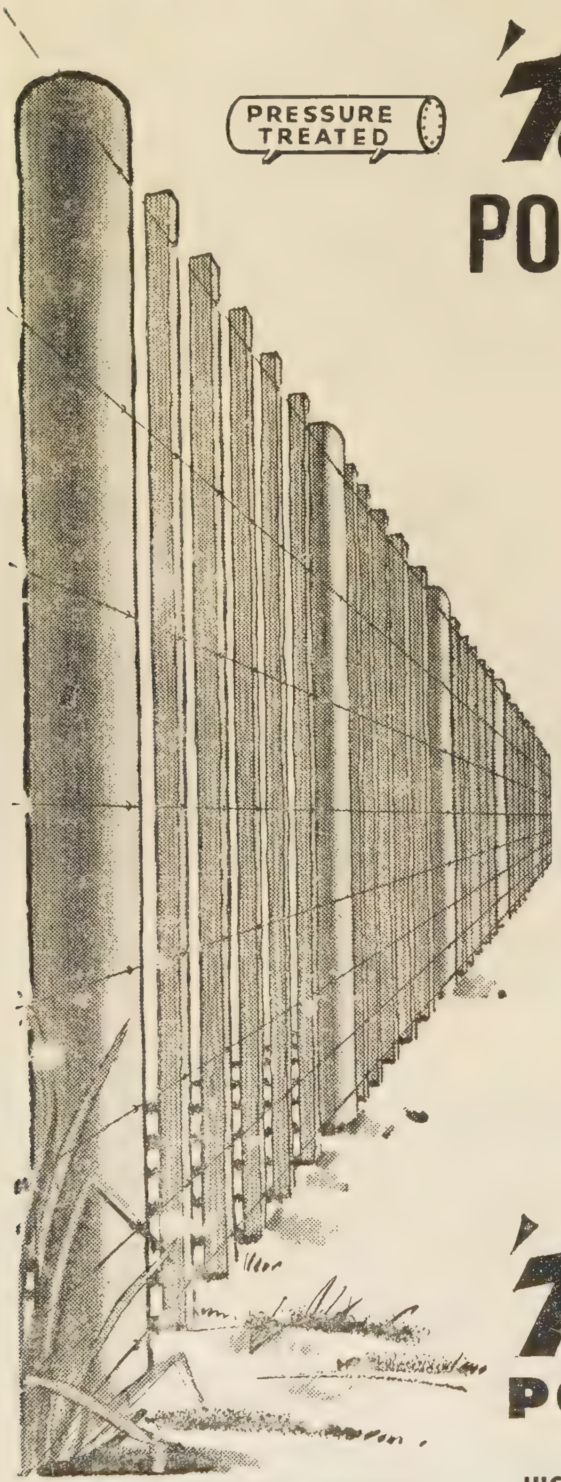
Particle board is also available as veneer-surfaced panels which are inherently stable. Plain sheets are used extensively as a base for laminated plastics and veneers.

Parquet Flooring

Native timbers are now available for laying as mosaic parquet for flooring.

Selected native timbers, principally tawa, rewarewa, rimu, and matai, are accurately machined into strips ⅜ in. thick. These are cut to length and assembled into 18 in. x 18 in. units, each unit containing 96 lamelli or slats which are then paper faced. These units can be laid on any true base, either timber or concrete, and fastened with adhesive as are lino tiles. The paper facing is damped and removed before the floor is sanded and finished.

The cost is below that of conventional parquet and the resultant floor has all the good qualities of a closely cramped board floor but with enhanced beauty.



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Bridges

The high cost of steel or concrete and the special skills and equipment necessary for construction in these materials usually prevent their being used for farm bridges of any great length, particularly as most farmers prefer to undertake their own construction.

Bridges can now be built with glue laminated timber trusses or girders, or timber trusses can be designed and fabricated, bolts and ring connectors being used.

Either method has many advantages over steel. As well as conserving overseas funds, the use of local material is cheaper. Construction, particularly with fabricated trusses using bolts and ring connectors, can be done without skilled labour and with the minimum of construction equipment.

Glasshouses: Preservatised timber frames constructed entirely of radiata pine are available precut for both commercial and domestic glasshouses in sizes ranging from 60 to 3,600 sq. ft. These units are designed to be extended in length or width, and when extensions are required louvre, sash, reused. Illustrated on page 569 are a domestic model and a commercial version during erection. These units will have the same durability as the much more expensive metal type of glasshouse frame.

Machinery parts: Locally manufactured discs are provided with wooden bearings as shown on this page. These bearings after manufacture are soaked in oil and give as good service at less cost under the severe conditions of disc operation as do metal bearings.

Stockyard construction: The use of long-lasting materials for both posts and rails in stockyard construction is desirable for economy. Preservatised timber posts used for such construction on a back country station are shown at right.

Acknowledgment

For illustrations and information to: United States Department of Agriculture Technical Bulletin No. 479; New Zealand Forest Service Bulletin No. 12; New Zealand Forest Products Ltd.; Fletcher Industries Ltd.; Hickson's Timber Impregnation Co. (N.Z.) Ltd.; New Zealand Timber Merchants' Federation; New Zealand Timber Development Association.

These wooden disc bearings, after they have been soaked in oil, give as good service under severe conditions, at less cost, as do metal bearings.

▼ Posts of preservatised timber are used for building stockyards.

[*Batchelor*

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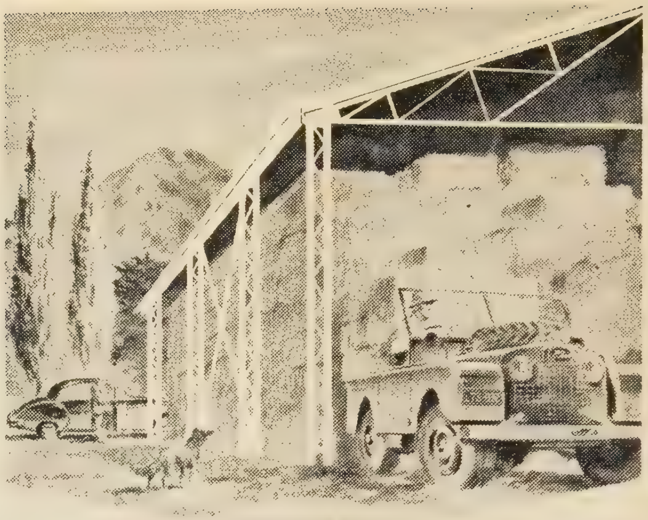

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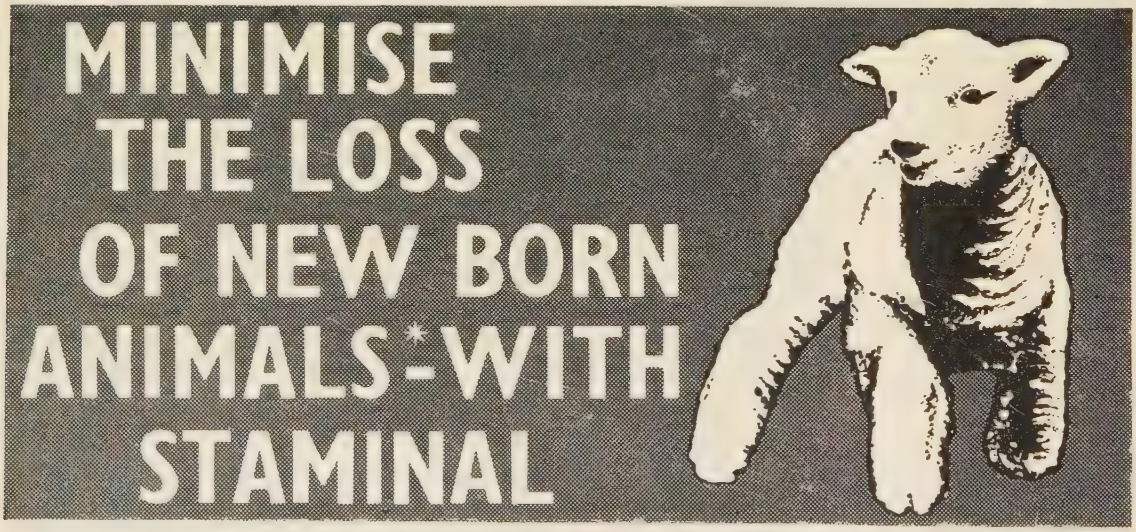

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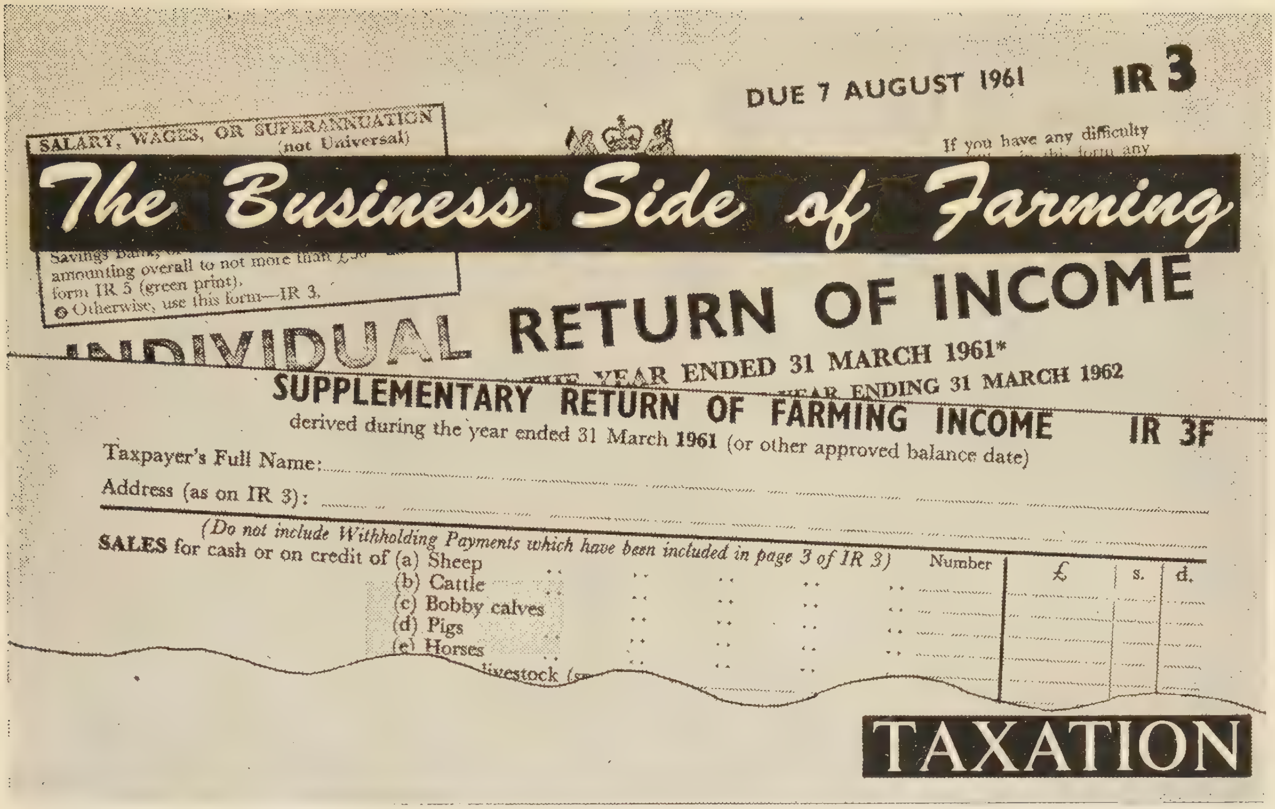

DUE 7 AUGUST 1961 IR 3

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● Otherwise, use this form—IR 3.

INDIVIDUAL RETURN OF INCOME

YEAR ENDED 31 MARCH 1961*

YEAR ENDING 31 MARCH 1962

SUPPLEMENTARY RETURN OF FARMING INCOME IR 3F

derived during the year ended 31 March **1961** (or other approved balance date)

Taxpayer's Full Name:

Address (as on IR 3):

(Do not include Withholding Payments which have been included in page 3 of IR 3)

		Number	£	s.	d.
SALES for cash or on credit of	(a) Sheep				
	(b) Cattle				
	(c) Bobby calves				
	(d) Pigs				
	(e) Horses				

TAXATION

By J. M. MILLER, Hamilton, and E. J. STONYER, Dunedin, Farm Advisory Officers (Economics), Department of Agriculture

MOST farmers rely on accountants to compile their annual returns for assessment of taxation. However, farmers themselves should know something of their taxation obligations and the deductions they may claim when the amount of income on which their tax will be paid is assessed. Though everyone must meet their tax obligations and not evade payment, they are entitled within the provisions of the Taxation Acts to arrange their affairs so that only the minimum amount of tax is payable.

INCOME TAX

FARMERS are liable for income tax (including both ordinary income tax and social security income tax) on all income derived from the use and occupation of any land. Though "income" is not defined, it can be taken to mean the year's revenue minus the cost of getting it.

Farmers are required each year to complete a special form of return (I.R. 3F) which provides space for all farm income and expenditure. The I.R.3F is to be attached to the ordinary return of income (I.R. 3), which provides space for income other than farming income. However, in practice, if a farmer's accounts are prepared by a public accountant, the accountant's standard form of trading account, profit and loss account, and balance sheet are usually accepted by the Inland Revenue Department provided they are attached to the official form and contain all the information specified in that form.

Ordinary income tax is calculated at graduated rates on **taxable income**, which is ascertained by deducting the annual special exemptions from the assessable income.

The special exemptions at present are:

	£
Personal exemption	468
Wife with no income	156
Each dependent child	78
Life insurance premiums paid (The maximum exemption for life insurance is or 20 per cent of the assessable income, whichever is the less.)	250

Composition of Assessable Income

Assessable income is defined as "income of any kind which is not exempted from income tax". It includes farming income, business income, interest, rents, wages, and dividends, etc.

In addition to the return from the sale of livestock and farm produce the assessable income of a farmer must include:

1. The value of any produce obtained from the farm and used in the farmer's household.

2. Prize money won at A. and P. shows. Entrance fees and other expenses may be claimed as a deduction.

4,500 lb. BUTTERFAT GAIN...

... thanks to S·M·U·

Says Mr. A. Bankier,
Kereone No. 1, R.D.
Morrinsville

(11.4.61)

Here's what Mr. Bankier says:
"Last year I milked 131 cows using standard inflations for a butterfat return of 35,500 lbs. At the beginning of this season I fitted 'S.M.U. Sealed Milking Units for the first time to my 5 cow doubled-up plant. TO DATE, WITH PART OF THE SEASON STILL TO GO MY BUTTERFAT RETURNS ARE 40,000 LBS., A GAIN OF JUST ON 4,500 LBS. AND A RECORD FOR THIS FARM. This has been achieved with only 125 cows and in a season which commenced with heavy rainfall in early spring affecting growth and then followed by seven weeks of dry weather. I unhesitatingly attribute this performance to the 'S.M.U.' Sealed Milking Units and warmly recommend them to farmers everywhere."

A product of TITCHENER NOTON LTD., Auckland
Available from all stockists of dairy farmers' requirements

Like Mr. Bankier, thousands of farmers all over New Zealand and Australia have found that the "S.M.U." Sealed Milking Unit not only eliminates quarter trouble but increases butterfat production, makes formerly restless cows placid and is ideal for breaking in heifers, to name just a few of the advantages. Get your farm up to date, ready for a profitable and troublefree season by installing "S.M.U." throughout your shed today.

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SEALED MILKING UNITS
S·M·U
S·M·U
SEALED MILKING UNITS

TN97.61D

3. Stud fees received.

4. Compensation received for livestock condemned.

5. Rent for any portion of the farm let.

6. Wool on hand. Wool on hand at balance date must be declared as revenue and the valuation is binding on the taxpayer. If the sale price exceeds the valuation, the surplus is deemed to be revenue in the year of sale.

7. Subject to the approval of the Commissioner of Inland Revenue, income from the sale of timber from trees planted to provide shelter, or to prevent erosion, or otherwise for agricultural or pastoral purposes, may be spread over a period of up to five years.

8. Livestock valuation: Any farmer may with the consent of the Commissioner of Inland Revenue adopt a standard value for the various classes of livestock on his farm. This is now the usual practice with livestock accounts. On this basis, an increase in value of livestock at the end of a farming year is treated as revenue and a decrease in value as farm expenditure.

Allowable Farm Expenditure

Most farm running expenses are obviously allowable expenses, but there are a number of items which apply only to farming. The main ones are:

1. **Land tax** on land used in the production of the assessable farm income.

2. **Legal expenses** of a lease or the renewal of a lease of land used in the production of the assessable farm income or in the borrowing of money employed as capital in the production of the assessable income.

3. **Car expenses:** Three-quarters of the car expenses—fuel, repairs, insurance, and registration. Where there are both a car and a truck the allowance for the car is reduced to 50 per cent of the expenses. Where expenses are above average particulars of travelling on farm business have to be supplied in support of the claim.

4. **Interest and rent:** Only the interest and rent which accrue or are paid during the year are deductible.

5. **Rations:** Where food and lodging are provided for employees, but the actual cost cannot be determined, £1 per man per week can be deducted.

6. **Fire damage:** Where a farm property is situated in a part of the country subject to dry summer conditions and where fires are liable to break out, the farmer can claim as a deduction the expenditure of repairing property damaged by fire.

7. **Trees planted for shelter or to prevent erosion:** A farmer may claim as a deduction the cost of planting and maintaining trees planted for shelter belts, erosion prevention, or for other agricultural and pastoral purposes or of erecting or maintaining fences to protect those trees. If there is any question about the purpose for which the trees have been planted, a certificate of a duly authorised officer of the Department of Agriculture or of the New Zealand Forest Service shall be final and conclusive evidence as to this.

Allowable Expenses for Development Work

To encourage farmers to develop land and thus increase production Section 119 of the Land and Income Tax Act 1954 authorises the deduction of certain expenditure on land development. Some of this expenditure is wholly deductible.

A. Wholly deductible development expenditure is that incurred in:

1. The eradication of animal or vegetable pests from the land.

2. The felling, clearing, destruction, and removal of timber, stumps, scrub, or undergrowth from the land.

3. The destruction of weeds or plants detrimental to the land.

4. The cultivation, topdressing, and grassing of new land.

B. Partly deductible development expenditure. For the following seven items up to £300 in the aggregate (not £300 for each item) may be allowed for the income year:

1. The draining of swamp or low-lying land.

2. The construction of access roads or tracks to or on the farm.

3. The construction of airstrips to facilitate aerial topdressing of the farm.

4. The construction of dams, stop-banks, irrigation or stream diversion channels, or other improvement to conserve or convey water for use on the land or to combat soil erosion.

5. The repair of flood or erosion damage.

6. The construction of new fences, including the cost of materials to rabbit proof existing fences.

7. The cost of sinking bores or wells, but not the cost of troughs, pumps, or anything severable from the land.

However, where land is developed and sold at a profit within five years of acquisition the profit on the land, up to the amount of developmental expenditure allowed as a deduction, will be treated as assessable income in the year of sale. A taxpayer may, however, elect to have revised assessments of income tax issued for the earlier years disallowing the developmental expenditure in respect of which deductions had been made in those years.

Depreciation

Depreciation claimed must be written off in the accounts of the taxpayer in a double entry system of bookkeeping. If accounts are not kept on a double entry system, claims for annual depreciation will not be allowed except for buildings. Depreciation on buildings will be allowed even if double entry accounts are not kept, provided a claim is made on the appropriate part of the return form. Depreciation allowed on farm assets is shown in the table below.

DEPRECIATION ALLOWED ON FARM ASSETS

(D.V., diminishing value of asset; C.P., cost price of asset*)

Item	Rate per cent
Agricultural plant and equipment, including	
Tractor-drawn implements	10 D.V.
Self-propelled equipment	20 D.V.
Beehive	Standard values
Bridges	
Wooden	2½ C.P.
Other	2 C.P.
Buildings	
Reinforced concrete	1 C.P
Brick, concrete, or stone	2 C.P.
Wooden	2½ C.P.
Glasshouses—Wooden framed	5 C.P.
Metal framed	3 C.P.
Pig sties—All concrete	5 C.P.
Timber and concrete	6 C.P.
Timber construction	10 C.P.
Portable huts	10 D.V.
Bulldozers	20 D.V.
Carts, drays, and wagons	10 D.V.
Concrete mixers	15 D.V.
Crates (sheep and cattle)	15 D.V.
Dams and reservoirs	Maintenance
If reinforced concrete	1 C.P.
Dips—sheep spray type including concrete tanks	10 D.V.
Fences	
Ordinary	Maintenance
Electric	10 D.V.
Haybalers	20 D.V.
Header harvesters	20 D.V.
Lime spreaders (bulk)	10 D.V.
Loose tools (no single item to exceed £30)	Replacements
Motor vehicles, trucks, and scooters	20 D.V.
Pipelines (farm)	Maintenance
Saws (chain)	50 D.V.
Silo (grain)	5 D.V.
Sprayers (not orchard)	10 D.V.
Tractors	20 D.V.
Trailers (at same rate as vehicle by which it is drawn)	
Windmills	10 D.V.
Motor cars: (1) Where farmer has both truck and car—half of	20 D.V.
(2) Where farmer has car only—three quarters of	20 D.V.

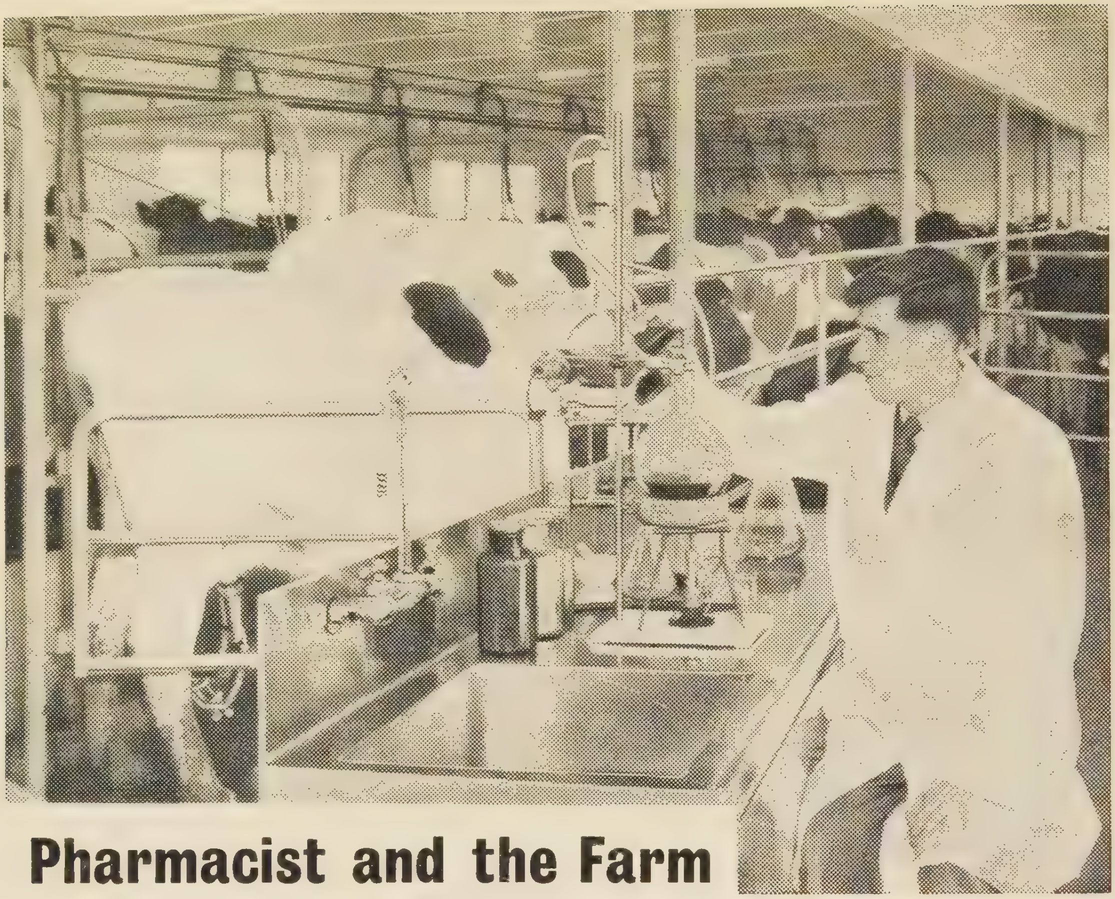
* The amount of depreciation assessed on the basis of diminishing value becomes less each year. That assessed on cost price remains the same each year until the asset is written off in the books.

Farm Dwellings

Depreciation at the appropriate rate (see buildings in table) is allowed on one-quarter of the cost price of the farm dwelling if it is situated on the farm, provided particulars are furnished in the space provided in the return form.

Special Depreciation Concessions

The Land and Income Tax Acts provide that where the Commissioner of Inland Revenue is satisfied that any



Pharmacist and the Farm

All the knowledge and experience of this Glaxo pharmacist, just one of Glaxo's many scientific workers, is available to help you combat the many diseases which threaten your herds. It is the pharmacist who ensures that the active ingredients of Glaxo's preparations are presented in the best possible manner to ensure full effectiveness. For example, it was Glaxo's pharmacists who first developed the free-flowing, non-irritant ointment base which carries the bacteria-killing penicillin throughout the delicate udder tissues to make Vetspen Cerate the superior penicillin udder injection for the defeat of mastitis.

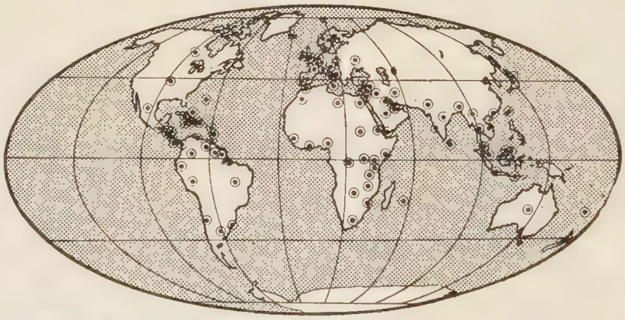
VETSPEN CERATE
Available in 4 strengths

"25"	25,000 units penicillin per tube.
"50"	50,000 units penicillin per tube.
"100"	100,000 units penicillin per tube.
"500"	500,000 units penicillin per tube. ("500" available on veterinary prescription).

From Veterinary Surgeons, Chemists and Stock & Station Agents.

Glaxo and the World of Science

Glaxo, founded nearly 100 years ago in the Manawatu, is now a world-wide organisation famous for such contributions to medical and veterinary science as penicillin, poliomyelitis vaccine, streptomycin, vitamin B_{12}, griseofulvin, cortisone and Complan (the complete food).



VETSPEN

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taxpayer engaged in any business has on or after 1 April 1960 and before 1 April 1963 bought or extended plant or machinery used for the business the Commissioner may allow special depreciation allowances in addition to the depreciation shown above. These special concessions are allowable for five years from the date on which the plant or machinery is first used in the production of assessable income. They are:

Six per cent for the first year
Five per cent for the second year
Four per cent for the third year
Three per cent for the fourth year
Two per cent for the fifth year

However, if the cost of the asset was small or if the asset was used only for a short time during the year in which it was acquired, the 20 per cent allowance may be spread over fewer than five years or apportioned between the years in some manner other than is shown above.

It should be noted that though the special depreciation allowance is based on the original cost, the ordinary depreciation allowance is based on the reduced value of the asset each year after the ordinary and special depreciation written off in previous years has been taken into account.

LAND TAX

For some years land tax in New Zealand has yielded about £1½ million per annum, which is a very small proportion of the country's direct taxation.

Assessment of Land Tax

The tax is assessed on the unimproved value of the land after deductions have been made for special exemption. The Inland Revenue Department assesses on the figure for unimproved value appearing in the District Valuation Roll.

Rates of Tax

At present the rates of land tax are:
On taxable balance up to £10,000, 1d. in £
On taxable balance £10,001 and up to £15,000, 2d. in £
On taxable balance £15,001 and up to £20,000, 3d. in £
On taxable balance exceeding £20,000, 4d. in £

Exemptions

Exemptions allowed are as follows:

1. Properties not subject to a registered mortgage:

(a) Where the unimproved value does not exceed £6,000, an exemption of £6,000.

(b) Where the unimproved value exceeds £6,000, an exemption of £6,000, reducible by £1 for each £1 in excess of £6,000. The exemption thus disappears at £12,000.

If the unimproved value of an unencumbered property is £7,000, the computation of the exemption can be made as follows:

	£
Unimproved value at which exemption disappears	12,000
Less unimproved value of property	7,000
Exemption	5,000

The taxable balance will be £7,000 minus £5,000 equals £2,000.

2. Properties subject to a registered mortgage:

(a) Where the unimproved value does not exceed £10,000, an exemption of £10,000.

(b) Where the unimproved value exceeds £10,000, an exemption of £10,000, reducible by £1 for each £1 in excess of £10,000. The exemption thus disappears at £20,000.

However, where the capital value of the mortgage is less than the amount allowed under (a) or (b) above, only the amount of the mortgage may be deducted. Examples:

1. If a property of an unimproved value of £8,500 is subject to a mortgage of £4,800, the exemption will be £4,800 and the taxable balance will be £8,500 minus £4,800 equals £3,700.

2. If a property of an unimproved value of £15,000 is subject to a mortgage of £7,000, the exemption will be computed as follows:

	£
Unimproved value at which exemption disappears	20,000
Less unimproved value	15,000
Exemption	5,000

Here the capital value of the mortgage at £7,000 is greater than the exemption of £5,000, and thus the amount of the mortgage cannot be taken as the exemption.

3. If a property of an unimproved value of £15,000 is subject to a mortgage of £4,000, the mortgage would be taken as the exemption, as it is less than the exemption computed in accordance with (b) above.

	£
Unimproved value	15,000
Mortgage	4,000
Amount assessable for land tax	11,000

Acknowledgment

The assistance given by the Commissioner of Inland Revenue in the compiling of this article is acknowledged.

Weed Control Conference at New Plymouth

THE 1961 New Zealand Weed Control Conference will be held from 11 to 13 July at the War Memorial Hall, New Plymouth. The programme is as follows:

11 July—"Weeds of Taranaki" (G. R. Moss); "An Evaluation of an Aquatic Weed Control Chemical, Acrolein" (W. M. Houlker); "Identification of Weedy Clovers" (A. J. Healy); review papers on chemical ploughing (L. J. Matthews); "A Place for Chemical Preparation in Strawberry Planting" (L. A. Porter); "The Possibility of Chemical Ploughing on Steep Hill Country" (L. W. Blackmore); "New Developments in Weedkiller Field" (S. N. Dawes); review papers on soil fumigation (P. S. Ferens); "Soil Fumigation" (A. J. McNeur); "Chemical Weed Control in Nursery Stock" (J. P. Salinger); "Herbicides and World Wide Developments" (K. Bridge, U.S.A.).

12 July—Review of developments with triazines (P. Gregory, Australia); review papers on soil sterilants (J. N. Fitzgerald); "Further Development in Non-selective Weed Control" (A. Wratislav); "2,3,6-TBA—Some Applications and Suggested Uses" (D. C. Isaacs); "The Residual Toxicity of Monuron, Simazine, and 2,3,6-TBA" (A. B. Webster); "The Substituted Triazine Herbicides in New Zealand" (G. W. Mason).

A field trip will be held in the afternoon to allow visitors to see local weed problems and agriculture.

13 July—Review papers on pasture weeds (A. C. Burgess); "Barley Grass" (M. G. Boyer); "Giant Buttercup Control" (A. J. Tuckett); "The Effects of Different Formulations of 2,4,5-T" (J. E. Bell); review papers on machinery (T. N. Gerrard); "Spray Distribution from Aeroplanes" (R. L. Taylor); "New Concepts of Spray Machinery" (P. M. Beddek); "Future Developments in Agricultural Spray Nozzles" (R. J. Watts); review papers on crops (M. S. Foreman); "Weed Control in Vegetables" (A. B. Webster); "Use of Combination of Weedkillers in Peas and Maize Crops" (T. M. Patterson); "Weed Control in Brassica Crops, Carrots, and Onions" (F. B. Thompson); "Pre- and Post-emergence Weed Control in Carrots" (A. H. Smith); "Research Notes on the Use of Diquat" (F. A. H. Meeklah); "Preliminary Evaluation of 2,6-DBN" (W. M. Houlker).

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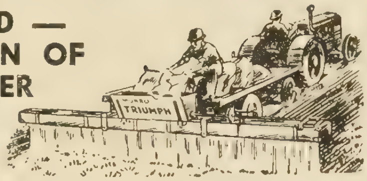
FOR EVEN SPREAD — FAST APPLICATION OF LIME OR FERTILISER



The Munro Triumph Topdresser ensures even spread at any speed. Chain driven from the hub of your truck or trailer, the Munro Triumph spreads lime or fertiliser and sows seed easier and cheaper than any other type of topdresser.

Available in four sizes:
10ft. 12ft, 14ft and 16ft.

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N.Z. Distributor,
P.O. Box 67, Invercargill.
Please send me Free Booklet on Munro "Triumph" Topdresser.
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Address ....
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ONLY PARAFLEX PROCESS 82 PROVIDES THESE *Unique* FEATURES

1. The most flexible shoe you've ever worn —requires no 'breaking-in'.
2. The only leather-welted, vulcanized shoe in the world. Combines cushioned comfort with smart appearance.
3. A truly waterproof bond of the long-wearing, non-marking sole to the finest quality leather upper.
4. Can be repaired as simply as any conventionally-made shoe.
5. The lowest possible price for an all-purpose shoe of such high quality.

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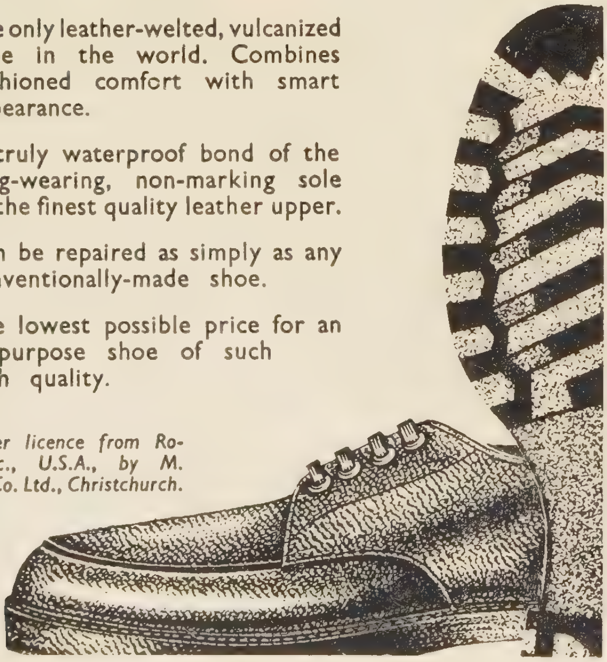

Stacks and stacks of reasons for using JUTE

Jute bags save space because they stack higher. Their rough, non-slip, flexible surface eliminates the danger of sliding. Tough Jute bags take some beating on docks and loading bays throughout the world. They're hefted and dropped and hurled around. Emptied they are still usable and worth re-selling. That's Indian Jute — the best investment for any packaged deal.

PACK IT IN JUTE

Inquiries to Indian Jute Mills Association.
P.O. Box 90, Dunedin.

IJ.9/60—1

Town Supply Herds Certified Clear of Reactors to Tuberculin Test

DURING March the following town milk suppliers were issued by the Department of Agriculture with clear herd certificates declaring that their herds are free of reactors to a tuberculin test.

To qualify for a clear herd certificate a supplier's herd must have no reactors to a tuberculin test of the whole herd. A herd comprises all cattle over six months of age depastured or kept on one property and includes dry or other stock from the property temporarily on a run-off. Where two or more herds share a common run-off all the herds using it have to be tested before any of them can qualify for clear herd certification.

In the list below the figures after each supplier's name and address are the number of the animals tested and these are followed by the date of the test.

These herds will be recorded in the New Zealand Register of Clear Herds, compiled by the Department of Agriculture.

AITKEN, A. Y., Woodside, R.D., Outram, 37, 3/2/61
AITKEN, J. C., 4YA Rd., Highcliff, Dunedin, 21, 16/2/61
AITKEN, R. W., c/o Post Office, Pukehiki, 37, 10/2/61
AMOS, E .H., 3 R.D., Whangarei, 89, 3/3/61
ANDRELL, L. E., Grovetown, Blenheim, 54, 6/3/61
APPLEBY, J., Appleby's Rd., Drury, 84, 13/2/61
AUBREY BROS., Mount Pleasant, Picton, 145, 9/3/61
BAIRD, J., Purakanui, 1 R.D., Port Chalmers, 57, 10/2/61
BARKLA, L., Box 55, Manakau, 84, 14/3/61
BARNES, M., P.B., Christchurch, 7, 10/3/61
BARR, H. G., Paretai, R.D., Balclutha, 118, 3/1/61
BATES, D. T., Airport Rd., Wanganui, 130, 6/3/61
BAY, W. D., Battys Rd., Blenheim, 51, 3/3/61
BEATTIE, B., Huramua, Wairoa, 68, 13/3/61
BEAVER, K. E. J., Karaka, 1 R.D., Papakura, 69, 7/3/61
BELL, H. J. and M. J., 2 R.D., Levin, 103, 12/3/61
BELL, W. T., Station Rd., Prebbleton, Christchurch, 23, 20/2/61
BENNETT, T., Owhango, Taumarunui, 52, 13/3/61
BEST, H. W., Box 21, Te Horo, 140, 4/3/61
BEVAN, N. R., Waikawa Beach Rd., Manakau, 71, 18/3/61
BEVINS, L. L., Coutts Island, Christchurch, 57, 2/3/61
BIRCHFIELD, S., Ohoka, Kaiapoi, R.D., Christchurch, 39, 27/2/61
BLACKIE, D. H. and D. L., P.O. Box 21, Cambridge, 100, 20/3/61
BLATCHFORD, S. D., Manaia Rd., Masterton, 74, 28/3/61
BLOOMFIELD, E. H., Marahau, R.D., Motueka, 36, 28/2/61
BOYD, R. L., Kapiti Rd., Paraparaumu, 131, 6/3/61
BRAY, E. J., Maharahara, R.D., Dannevirke, 79, 30/3/61
BRAZENDALE, G., Matarawa, Carterton, 79, 20/3/61
BRAZENDALE, O., Swamp Rd., Carterton, 76, 20/3/61
BROWN, A. N., Motupiko, R.D., Wakefield, 39, 21/3/61
BROWN, T. P., 4YA Rd., Highcliff, Dunedin, 37, 16/2/61
BROWNLEE, W. D., Box 38 (Waiohiki), Taradale, 107, 13/3/61
BRUNT, T., Karaka, 1 R.D., Papakura, 85, 10/2/61
BULL, I. M., Omatane, Utiku, 112, 13/3/61
BULLIVANT, W. E., Matokitoki Valley, Gisborne, 121, 6/3/61
BURKE, D. G., Awahuri Rd., Feilding, 76, 21/3/61
BUTLER, K. C., Makarewa, 41, 25/3/61
BYERS, R. B. S., 9 R.D., Invercargill, 99, 6/3/61
CALDER, C. D., North Rd., Invercargill, 16, 17/3/61
CAMERON, W. D. and A. E., Berwick Rd., 1 R.D., Outram, 41, 3/2/61
CARDWELL, W. L., Huffey St., Geraldine, 2, 14/3/61
CARLE, A. F., Foxton Rd., R.D., Levin, 162, 22/2/61
CARSON, D. M., Main Rd., Korere, 11, 23/3/61
CHAPMAN, R. V. and M. M., Radcliffe Rd., Belfast, Christchurch, 15, 27/2/61
CHISNALL, H. W., Lower Songer St., Stoke, Nelson, 54, 27/3/61
COCHRANE, D. and C. H., Karaka, 1 R.D., Papakura, 92, 7/3/61
COE, R., R.D., Mangonui, 78, 28/3/61
COLEMAN, R. W., Ladbrooks, 4 R.D., Christchurch, 48, 17/3/61
COLES BROS., Waiau Pa, Patumahoe, 80, 7/2/61
COLEY, H. E., Roslyn Rd., Levin, 48, 20/3/61
COLLINS, F. L., Taroa, Taihape, 134, 10/3/61
COLQUHOUN, J. M., Parish Line Rd., Ardmore, 147, 13/3/61
COLVIN, M. S., Otatara, 26, 25/2/61
COPELAND, T. L., Otatara, 39, 28/3/61
CORRIE-JOHNSTON, C., 2 R.D., Upper Moutere, 32, 7/2/61
COSTAR, E. A., Karaka, R.D., Papakura, 62, 21/2/61
COTTLE, H. E., Ihakara, R.D., Levin, 59, 13/3/61
COTTLE, V. J., Old Hautere Rd., R.D., Te Horo, 188, 7/3/61
COWAN, A., Momona, R.D., Outram, 31, 27/1/61
CRAW, E., 4 R.D., Christchurch, 67, 3/2/61
CRIMOND (Blenheim) LTD., c/o Mr G. F. Snowden, Bells Rd., Blenheim, 112, 6/3/61
CROOKES, M. J., 2 R.D., Pukekohe, 76, 3/3/61
CROSBY, T. B., R.D., Hexton, Gisborne, 53, 6/3/61
CROWE, J., West Plains, Invercargill, 35, 18/3/61
CULCAIRN FARM, c/o Post Office, Stirling, 69, 2/1/61
CULL, R., West Plains, Invercargill, 44, 18/3/61
CUMMING, C. D., Ormond, Gisborne, 77, 6/3/61
CUTLER, L., Tai Tapu, 2 R.D., Christchurch, 34, 10/3/61
DAVEY BROS., 5 R.D., Palmerston North, 58, 15/3/61
DAVIDSON, T. A., Morton Mains, 79, 24/3/61
DAVIS, V. A., Te Rehunga, R.D., Dannevirke, 56, 28/3/61
DICKENS, J., Flat Bush Rd., Papatoetoe, 90, 27/2/61
DILLON, J. L., Springston, 4 R.D., Christchurch, 50, 10/3/61
DIXON, G., P.B., Hira, Nelson, 78, 14/3/61
DOUGHERTY, J. P., Te Rehunga, R.D., Dannevirke, 81, 28/3/61
DRON, W. D., Hope, R.D., Richmond, 114, 28/2/61
DUNCAN, C. G., Alfriston Rd., Manurewa, 79, 7/3/61
EARLE, N. H., Gladstone Rd., Levin, 72, 20/3/61
EASTON and SONS, 2 R.D., Upper Moutere, 28, 3/3/61
EDEN, C. H., 393 Prestons Rd., Christchurch, 32, 21/2/61
EDEN, J. T., R.D., Wakefield, 38, 27/2/61
ELLETT, T. R., Ihumatao Rd., Mangere, 225, 14/3/61
ELLIOTT, H. M., Karaka, 1 R.D., Papakura, 52, 28/2/61
EVERTON, G. L., Purcell St., Foxton, 50, 27/2/61
FAHEY, A. J., West Plains, Invercargill, 57, 18/3/61
FEATHERSTON, J., Arawhata Rd., Paraparaumu, 107, 18/3/61
FENTON, R. J., R.D., Waerenga-o-hika, Gisborne, 26, 6/3/61
FENWICK, C. F., Box 17, Otaihanga Rd., Paraparaumu, 50, 27/3/61
FERGUSON, K. J. I., Flat Bush Rd., Papatoetoe, 84, 27/2/61
FIELD, A. E., McShanes Rd., Richmond, 60, 6/3/61
FLETCHER, R. J., The Glen, R.D., Hira, 19, 28/3/61
FLORANCE BROS., Frosts Rd, Burwood, Christchurch, 164, 21/2/61
FOOTE, L. N., 2 R.D., Upper Moutere, 66, 6/3/61
FORSTER, L. A., Hobsonville Rd., 2 R.D., Kumeu, 46, 7/3/61
FRASER, R. T., Bay Rd., Invercargill, 24, 17/3/61
FROST, A. H., R.D., Hira, Nelson, 37, 14/3/61
FROST, L. C., R.D., Hira, Nelson, 54, 13/3/61
FRY, D. V., Riwaka, 7, 28/2/61
GARDINER, C. W., R.D., Brightwater, 29, 23/3/61
GENET BROS., Maharahara, R.D., Dannevirke, 58, 28/3/61
GILL, F. H., R.D., Hira, Nelson, 41, 28/3/61
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New Fumigation Station Being Built in South Island

BOTH import and export of certain commodities will be facilitated with the building at Woolston, Christchurch, of a new fumigation station for the Port Agricultural Inspection Service of the Department of Agriculture. The station, which will be similar to those operating at Auckland and Wellington, will be the first of this type in the South Island.

Vacuum fumigation will be applied to any material requiring such treatment to ensure destruction of any pests or animal disease organisms. Methyl bromide will be used against insect pests and formalin to kill animal disease organisms. A feature of the design of the Woolston plant is the special precautions taken for safe disposal of gases after fumigation.

By use of modern fumigation techniques it is possible to remove risks otherwise associated with the importation of certain goods or those from some overseas countries. Export, too, of seeds for example, is sometimes contingent on prior fumigation of produce.

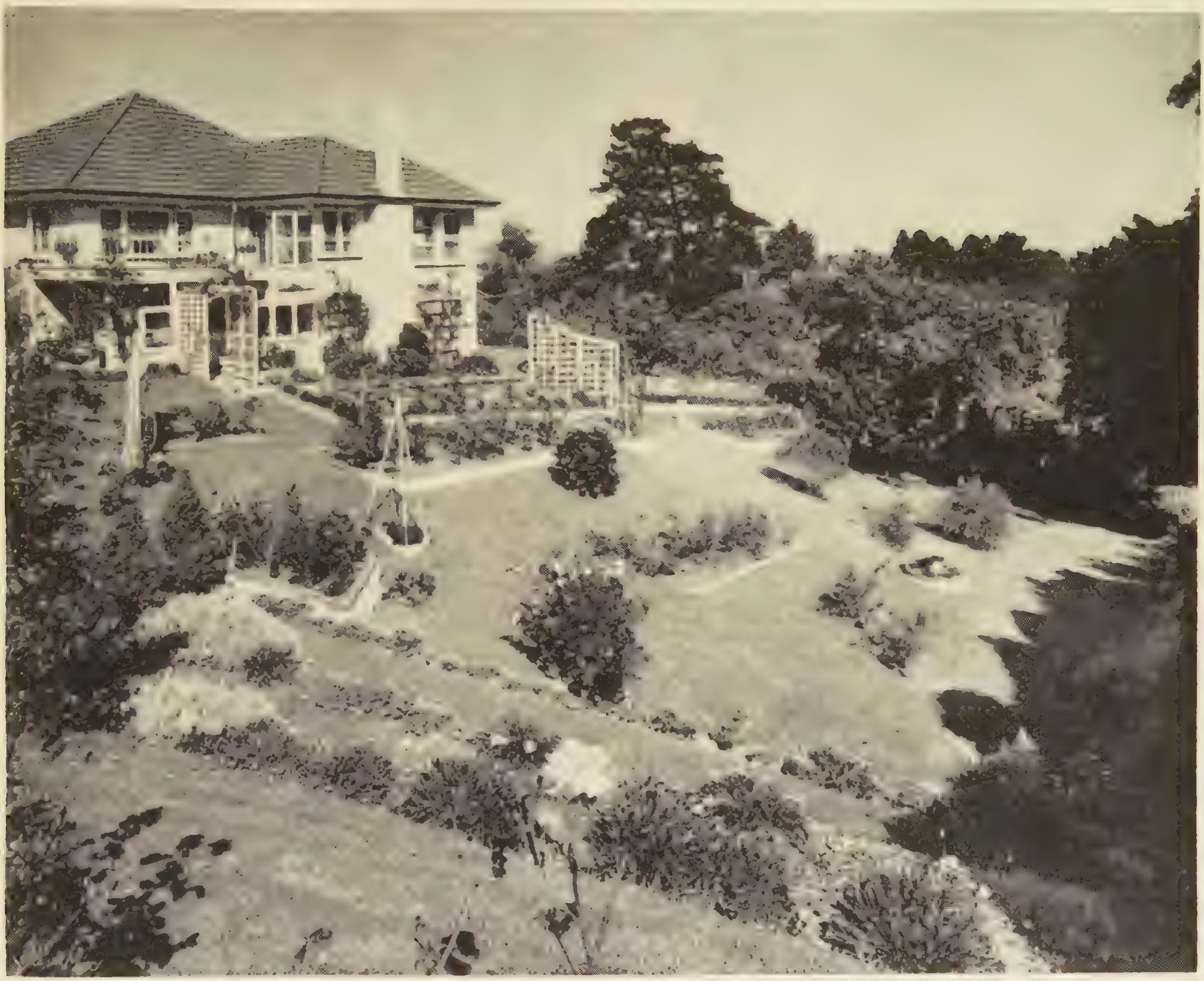
Apart from its use in connection with quarantine the fumigation equipment will be available for the treatment of infested produce in store or borer-infested furniture, pianos, etc.

The new fumigation station will take a stage further the arrangements made by the Department in recent years for strengthening quarantine without further restricting the range of goods that can be brought into New Zealand.

FLOWER GARDEN

By J. S. SAY, Horticulturist,
Department of Agriculture, Auckland

Gardening on Difficult Sections



[*Sparrow*

MOST people, if they have a choice, avoid difficult sections, preferring those which are rectangular, which are level or nearly so, and which have a good layer of reasonably fertile soil. The difficulty of making a good garden is one of the many reasons given for this, but it is often easier to plan attractive gardens with individuality on difficult sections than on the usual flat rectangles.

▲ **The illustration** shows a garden on a section with steep, curved slopes like a quarter of a basin. The owners are very keen rose growers and were faced with the problem of laying out a rose garden on a section which is far removed from what is usually considered an ideal site for one.

One section of the slope (foreground) has been terraced more or less conventionally with grass walks on each level. The other parts have been treated in a most interesting way to form rose beds. These are about 4 to 5 ft wide and the retaining walls have been made just high enough to give a fairly level surface. The photograph was taken in late autumn so that details of construction may be seen easily; during spring and summer the lines of the beds are masked by foliage and dwarf borders.

The rough, neglected waste land which adjoins the garden has been used to form a background. Rather than trying to shut it out by a fence or wall the owners have blended it in by planting in the lawn a few specimen shrubs with irregular habits of growth and by planting a shrub border on the boundary. The transition is thus gradual from the rather formal outline of the beds (they would have been better curved to follow the contours) to the rough background.

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GARDENING ON DIFFICULT SECTIONS

DIFFICULT sections are those with some natural physical peculiarity (sloping, rocky, windswept), with an awkward shape (irregular, narrow), or with a combination of these factors. When a garden is being planned or altered on one of these sites three points should be kept in mind:

If the house is not built, site and plan it to suit the section.

Make use of the difficulties rather than fight them.

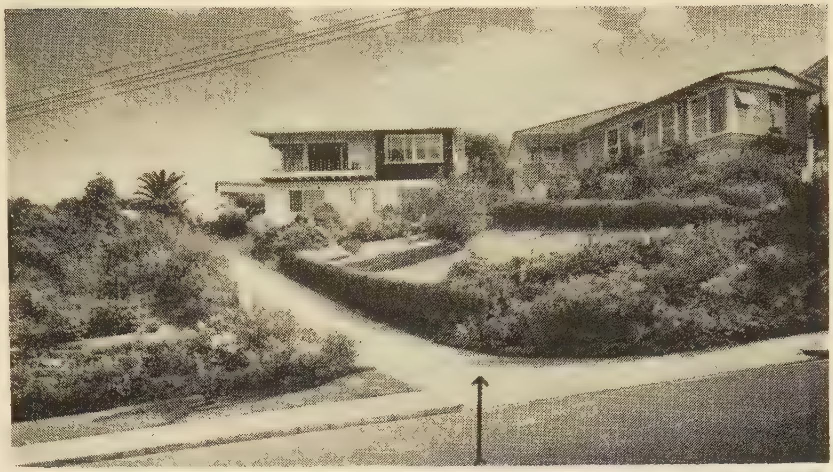
Use only plant material suited to the soil, site, position, etc.

Photographs and diagrams are used in this article to show how a number of home gardeners have dealt with their difficulties. Though no two gardens present the same problems, the examples may be a guide or an inspiration to owners of difficult sections. Some of the gardens described are larger than the usual ¼- or 1/5-acre town section and the use of a wide-angle lens for the photographs accentuated the size in some cases, but the ideas shown could easily be adapted to small areas. The diagrams are not to scale, but show the general layout of the gardens and should be studied in conjunction with the photographs.

The illustrations show two → houses which have been sited and planned to make the most efficient use of the sections and how the owners have cooperated to plan their gardens as one harmonious whole. A better idea of the advantages and the effects of this cooperation may be obtained if one section of the photograph and of the diagram is covered. (The position of the boundary is arrowed on the photograph.)

The drives in wide sweeping curves have cut the sections in two, yet there is an impression of space achieved by combining the two lawns. These follow the general slope of the sections, thus avoiding the rather incongruous effect of a level lawn on a hilly area and the need for high retaining walls.

The planting on the slopes is a fairly dense mixture of shrubs, perennials, annuals, and succulents and always provides some colour and interest.



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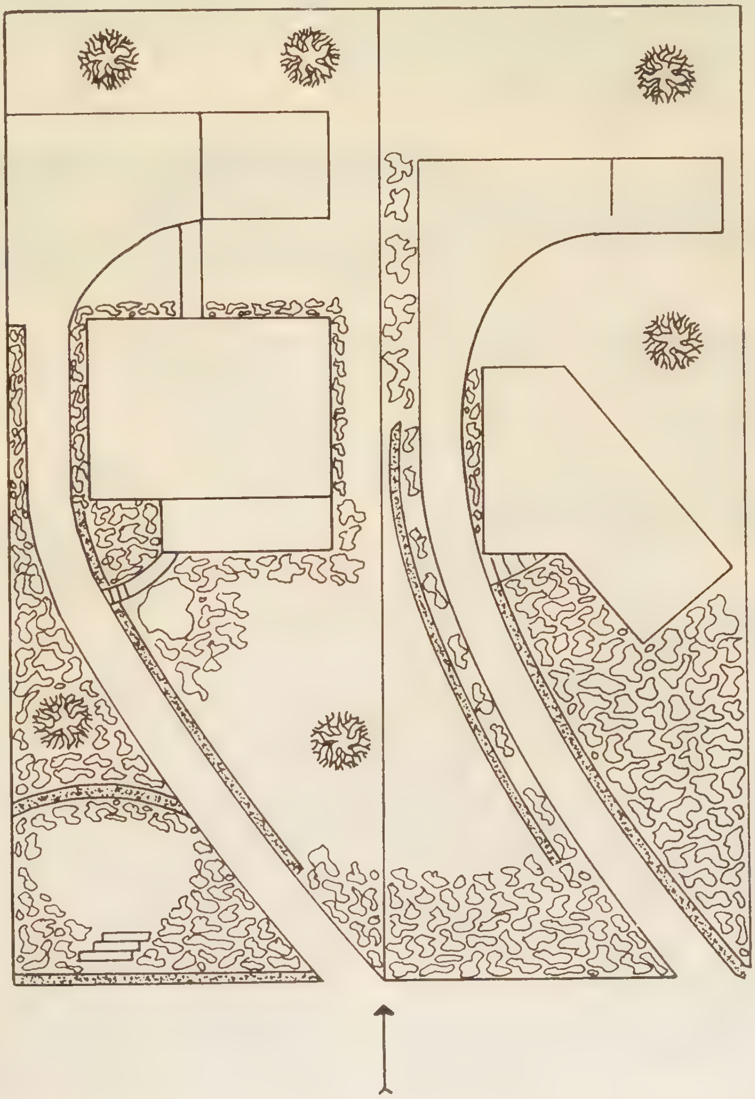

Tall shrubs ✶

Trees ✺

Low shrubs, perennials, etc. ✿

Retaining walls ▨

Direction of photograph ↑

The symbols shown are also used in the diagrams on pages 585 and 589.

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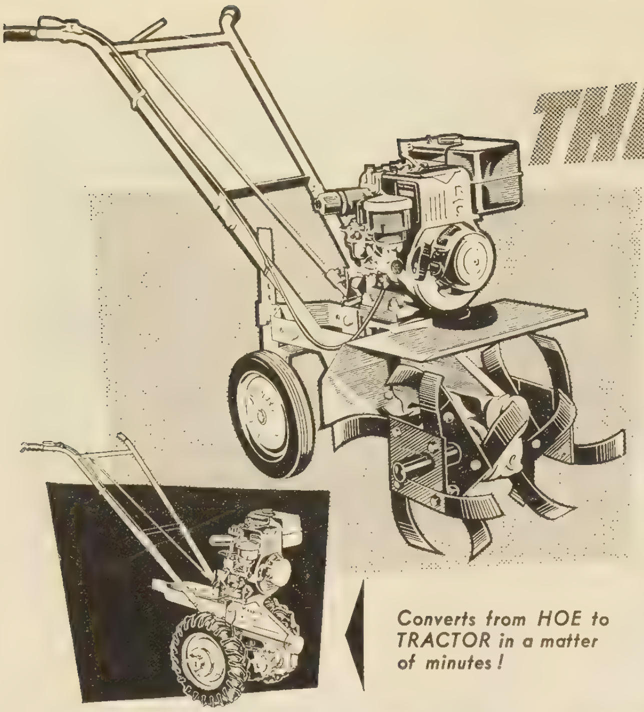

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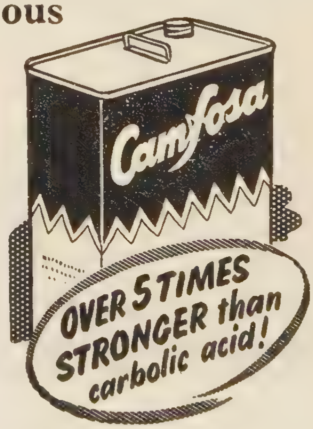
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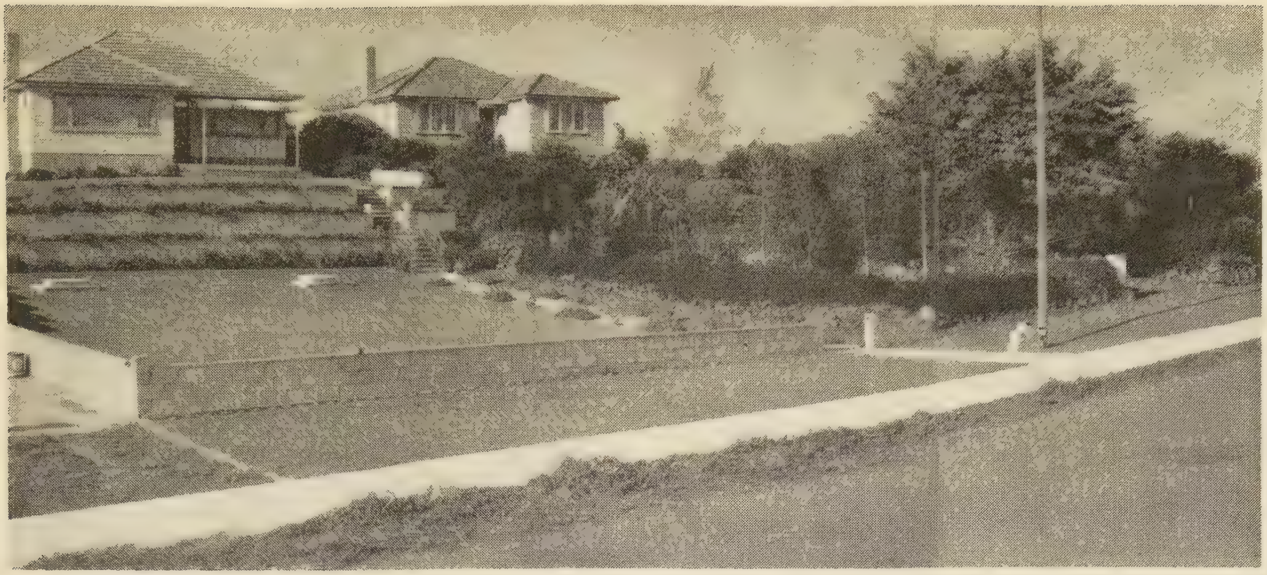


[*Sparrow*

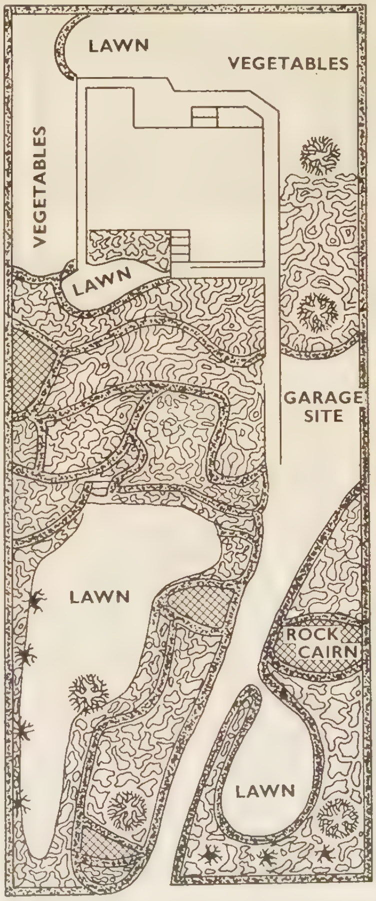
The illustrations on this page show two very different treatments of sections which, eight years ago, were a wilderness of rough volcanic rocks covered by bracken and gorse (see illustration below).

At left above, the rocks have simply been obliterated by retaining walls, filling, and a shallow covering of soil on which lawns and flower borders have been established. The objective was a simple layout requiring minimum maintenance and, with a motor mower, that has been achieved. The severe lines of this garden are given colour by use of bright flowering annuals and perennials in the narrow terrace beds and in borders beside footpaths.

At right above, the owner has made use of the rocks, ridges, and hollows to form a natural garden. Irregular retaining walls of rock have been built to form pockets and terraces for gardens and lawns. (See diagram at right.)

By use of dry rock walls (no mortar) to modify rather than destroy rocky outcrops and contours, much of the natural character of the section has been retained. Surplus rocks were piled into cairns to accentuate natural features, and have been covered with vigorous climbers such as bougainvillea and *Jasminum polyanthum*, while *Ficus minima* has been used on rock walls. Rubble and earth salvaged from among the rocks filled most of the terraces and surprisingly little soil was brought in for topping and levelling.

At first only plants known to stand very dry conditions such as lantana, *Acacia baileyana*, and New Zealand flax were used, but now the garden is established it has been found that a very wide range of plants can be grown, as the roots seem to penetrate from the pockets deep down into the



[*Sparrow*

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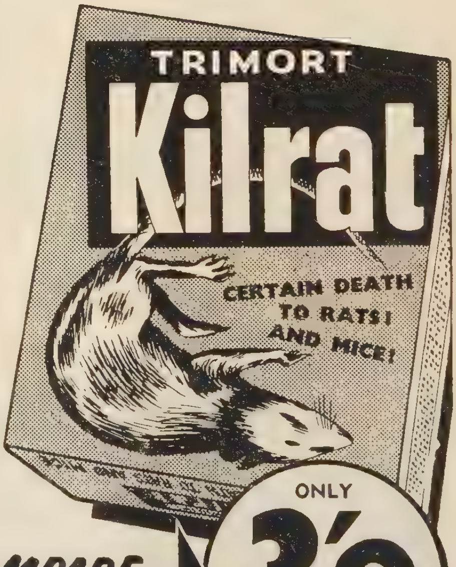
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crevices, where it is cool and apparently moist. Ferns, fuchsias, citrus, and many other plants which would not normally be expected to grow on rock are now thriving. A feature of this garden is the informal hedge of *Ceanothus impressus* planted three years ago on the boundary between the two sections.

In the colder parts of New Zealand such a section could be developed into a true rock garden by use of alpines and scree plants, but in the north this is not practicable and the owner has concentrated on a more tropical effect for his garden on rock.

Two other views of the sections shown on page 585 are given here.

[*Sparrow photos.*

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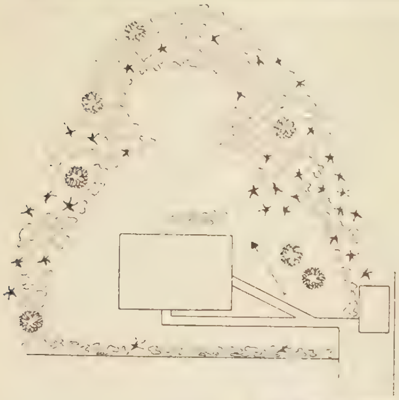


The illustrations above and at left show the first stage of the development of a garden on a roughly triangular right-of-way section on an open, windswept point. The original scrub, mainly native, was left on the perimeter to shelter the garden. In one part it was left within the general outline of the half circle (see diagram at left), but thinned, leaving only some of the taller shrubs, which have been underplanted with material requiring extra shade and protection. The lawn area was graded to the general contours of the section, giving it a natural effect.

Future planting will consist mainly of shrubs with flowers or good foliage effects, which will be set in an informal border with the natural scrub as a background. The enclosed part toward the apex of the triangle, at present used mainly for vegetables, would lend itself to many interesting ornamental treatments.

→

This illustration shows how a long, narrow area behind a house has been developed. Though the layout is based on a series of straight lines, a few shrubs, the level area for the clothes line, and the steps break them enough to avoid monotony. The sloping banks, studded with rocks to help stabilise the surface, are planted with compact and prostrate perennials and shrubs which, when established, will be attractive and fairly easily maintained.

Garden Work in July

Routine Work

Check drains regularly to make sure that they are running freely and are not blocked. Dig open drains to carry away surface water where ground is waterlogged. If the roots of trees and shrubs are submerged for prolonged periods, they will die, resulting in the decline or death of the tree later in spring or summer.

Cover compost heaps with a metal or plastic sheet to prevent the material from becoming sodden; otherwise normal decomposition is prevented.

Check and renew ties as necessary. Provide shelter for young and newly planted trees and shrubs by placing a scrim shield on the windward side.

Protecting Exposed Sites

New gardens or borders on exposed sites need extra protection. Do not destroy all the native bush, as even manuka provides welcome protection until other plants are established.

When a natural effect is desired, thin out the native bush so that there is sufficient light for new plants. As the new shrubs and trees grow, cut more of the manuka back, but leave a few plants, with lacebark, kowhai, etc., so that the garden blends pleasantly with the surrounding bush.

By JOY WATKINS,
Horticultural Advisory Officer,
Department of Agriculture,
Auckland

Mowing the grass and weeds between the shrubs makes pleasant green pathways allowing easy access to all parts of the section.

Most native trees and shrubs grow more quickly and successfully if reared in the shelter of other plants. Small specimens transplant more readily than larger ones, excepting pungas.

An open trellis makes an attractive screen and a support for climbing plants.

Pungas and other tree ferns move well if a large, shallow rooting mass is retained, with the leaf growth cut hard back to the stump.

Many lovely native plants can be raised from seed if the seed pods are collected before they have turned brown and the seed is sown immediately. If the seeds of kowhai or kaka beak have become dry and fully ripe, they should be covered with very hot water and left in the water overnight before sowing. Corokia and pittosporum fruits should be mixed with sand and stored in a refrigerator for four weeks before sowing.

Planting New Gardens

New sections from which all trees and shrubs have been cleared may be improved rapidly by transplanting large specimens of certain shrubs, such as rhododendron, azalea, michelia, deutzia, kolkwitzia, kerria, and abelia. These will all move satisfactorily if lifted and replanted carefully. Deutzia, kolkwitzia, and abelia must be moved while they are dormant, and it is advisable to cut back top growth by about half.

Few other trees or shrubs transplant well when they are mature, as they have root systems which are easily destroyed if disturbed. Roots of some, such as magnolia, are fleshy and brittle; others are few and very long, as with most of the South African and Australian shrubs. Those which transplant most readily have a large, close mat of fibrous roots which can be lifted intact.

Transplant deciduous trees and shrubs when they are leafless and dormant. Transplant evergreens in the late autumn or early spring except in favourable climates, when they may be moved at any time during winter when the soil is not too wet.

People moving, possibly to another district, may want to take plants with them. Small specimens of many favourite plants can be transplanted if the plants are wrenched, first on one side and then on the other, at least six and three weeks before lifting, watered thoroughly the day before, and the root-ball covered closely with scrim or plastic for the move.

It is disappointing to have to leave some well grown shrubs and trees, but the only alternative is to propagate young ones from seed or cuttings in advance or to purchase new ones as soon as the planting season comes round in the new section.

Prepare special beds for sowing and planting choice plants such as lilies if the soil is unsuitable. Raise the level of clay soils to improve drainage and work in bush mould, leaf mould or compost, and scoria or crushed pumice, adding a phosphate manure such as bonemeal at 4 oz to the square yard.

Sowing

Do not sow seeds if the soil is wet and cold, or they will rot, as seeds need warmth and air to germinate. A pinch of thiram dust shaken up with the seeds in the seed packet before sowing protects them from damping-off diseases.

If frames or glasshouses are available, sow annuals requiring a long growing season, such as antirrhinum, lobelia, and statice.

Climbing Plants

Gardens can be transformed with the judicious use of climbing plants, and the ground can be prepared and supports made ready in July. Brick, stone, or cement step risers and retaining walls clothed with *Ficus pumila* blend the garden in with the foundations of the building.

Honeysuckle, clematis, or passion flower climbing up wire or trellis may be used against the wall of a house or shed, or as a screen for a secluded part of the garden. Strong single posts or tripods covered with climbing roses, *Campsis* 'Mme. Galen', bougainvillea, or jasmine catch the eye and give a strong contrast in a garden. In the less formal type of garden wistaria or clematis can be trained to grow through a laburnum or apple tree or a strong climbing rose can be made to scramble up through a yew or some other dark conifer.

Posts and trellis erected for climbing plants must be strong enough to hold the weight of branches and leaves, especially if they are likely to catch the wind. Supports must be anchored firmly in the ground, and any timber used should be treated to resist decay.

Borer

When pruning shrubs check them for borer damage. Cut out badly affected small branches. If borer is present in the main branches or the trunk, clear the entrance to the hole with a piece of wire, inject petrol (**not** kerosene) with a pressure oil can, and seal the hole with clay, putty, or similar material so that the petrol fumes are kept in to kill the borer. Lacebark, ribbonwood, broom, and soft-wooded plants are particularly susceptible to borer attack.

Roses

Though some growers prune their roses in June, better results are usually achieved from pruning when growth is beginning, normally in early August. Cut back or stake any very long growths which may catch the wind, as roots can be disturbed in this way. After gales or severe frosts firm any loosened bushes with the heel. Rose pruning will be described next month.

Unwanted Trees and Stumps

Felling a tree and digging out the rootstock is the only reliable method of disposing of unwanted trees. A tree may easily be killed, but a dead tree should not be left standing without at least lopping back the branches, as it can blow over and may damage plants or buildings.

If necessary many trees can be killed by ring-barking, that is, removing a wide strip of bark from the trunk to expose the hard wood in the centre so that the flow of sap between the roots and shoots is interrupted. Alternatively a V cut can be made in the bark all round the trunk and into this channel can be poured one of the hormone weedkillers, 2,4,5-T or 2,4-D, diluted with water.

If a tree is to be removed in the home garden, it should first be trimmed of as many branches as possible to reduce its size and therefore any damage when it falls. After the growth which has been removed has been cleared away and burnt a trench should be dug round and partly under the tree so that the main roots are exposed and can be severed with axe or saw. The main trunk is useful to lever the root system once a few roots have been cut on one side of the tree. It is much easier to get the root stump out attached to the trunk than to dig it out once the trunk has been cut down to within a foot or so of ground level.

Stumps which have been left in the ground will gradually rot, particularly if they are covered over with soil. There is no method of treating a stump which will accelerate this process.

Boring holes in the stump and then filling them with saltpetre is a method which is rarely effective.

Often a good way of dealing with a dead or fallen tree or a tree stump is to make it into a decorative feature. A small stump is easily covered with a sprawling shrub or ivy-leaved geraniums. A larger one can be converted to a garden seat or table. If the trunk is still standing, staghorn fern, bromeliads, and epiphytic orchids can be grown on it or it may be a support for climbing plants.

A tree which has blown over can be transformed by planting according to whether it lies in a damp, shady position or exposed to full sun. In a damp, shady place ferns of all kinds will grow on it and round it. In the first place rank weeds will have to be removed, and ferns collected and planted, but gradually moss and ferns will predominate. Round the base of the trunk can be grown clumps of Japanese iris, primulas, forget-me-not, and violet and in some situations the robust white or yellow calla looks most effective against a dark background. Climbing plants must be used with discretion; otherwise the smaller plants are smothered.

In a dry, sunny position, succulent plants will grow in crevices in the bark and roots, with bulbous plants—belladonna, crinum, agapanthus, nerine, and bearded iris—round the base; or the whole may be transformed into a mound of flowering climbing plants.

Lectures and Demonstrations

Lectures and demonstrations organised during winter should be attended and opinions obtained on gardening problems.

Plant exchange tables at such meetings are a lucky dip, but most of the plants offered flourish locally, and their culture is readily explained by those who have brought them. Some of these plants are not readily available through normal trade channels.

Glasshouse and House Plants

As at all times during winter, water with great care. Plants growing in plastic containers require less than those in clay pots, as there is no loss of water by evaporation through plastic.

Cut back late chrysanthemums to 6 to 9 in. high as they finish flowering. They need plenty of light to produce good cuttings. Mice and slugs can destroy new shoots, so protect the stools from these pests.

Floral Decoration

Cut bulb flowers with a sharp knife and place them in deep, cold water for several hours before arranging. Cut away any white portion at the base of the stems, as this does not absorb water easily. Bulb flowers will last much longer in shallow water in floral arrangements than in deep water in a vase. Do not cut more leaves than necessary, as the bulb depends on these leaves to manufacture food. The food fattens the new bulb and ensures the production of flowers for the following season. If many bulb leaves are required for decorations, it is preferable to grow some cheap, vigorous variety for this purpose.

Many winter-flowering shrubs are valuable for their cut flowers. A few which are not difficult to grow if the soil is well drained are manuka, leucospermum, leucadendron, phylica, waratah, protea, and thryptomene. Young specimens of these can be planted in most gardens in August.

When shrubs are being cut their pruning requirements should be borne in mind so that the shape and future flowering are not adversely affected. Always use a sharp knife or secateurs, as snapping or tearing the branch leaves a jagged wound which is difficult to heal and which may allow the entry of disease.

Japonica Jam and Jelly are Unusual

THE fruit of the ornamental japonica bush has a distinctive flavour, rather like that of the quince. Small quantities of the peeled, sliced fruit may be added to stewed apples or apple pie as an alternative to the more usual cloves.

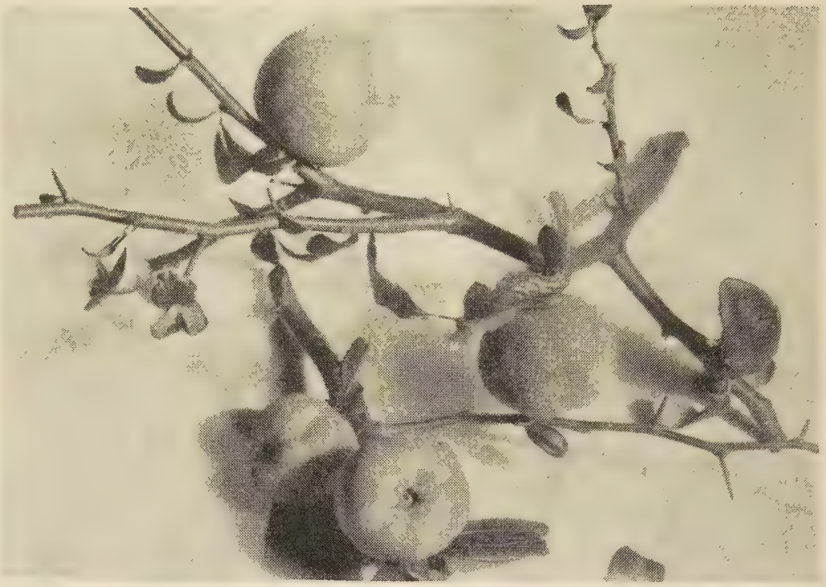
JAPONICA fruit makes a pleasant jelly, and with the addition of cloves or spice a rather unusual, exotic-flavoured jam can be made.

Japonica Jelly

2 lb of japonica fruit
1 lemon
¼ pint of water
1 cup of sugar for every cup of fruit juice

Wash the fruit and cut it roughly into small pieces. Grate the rind from the lemon. Heat the fruit, water, and lemon rind together until the fruit is soft. Do not boil hard or too much water will evaporate. Strain the fruit pulp and juice through a jelly bag, taking care not to squeeze the bag. (The jelly will be cloudy if some of the pulp is squeezed into the juice.) Measure the juice, bring it to the boil, and add the correct amount of sugar.

Stir the contents of the pan until the sugar has dissolved. Boil gently for five minutes and then test a small quantity on a cool plate. If it jells, skim the hot jelly mixture and bottle it in clean, hot jars. Cover each jar with a thin layer of liquid paraffin wax. When this has set cover with cellulose film.



The Japanese quince or single red japonica (*Chaenomeles lagenaria*). When the "apples" are fully mature the skin is a mottled greyish green and is slightly wrinkled.

Japonica Jam

3 lb of japonica fruit
4½ pints of water
6 to 8 cloves, cinnamon stick, or ½ teaspoon of powdered allspice
1 cup of sugar for each cup of sieved fruit pulp

Wash and slice the fruit and cook it with the water until it is soft. Sieve the fruit and measure the fruit pulp and liquid, adding an equal quantity of sugar. Bring to the boil, stirring until the sugar has dissolved. Add the cloves, cinnamon stick, or allspice and continue boiling the jam for a further 10 minutes. As soon as the jam jells when tested on a cold plate, bottle it in hot, clean jars. Cover the jars immediately.

—BETTY JOHNSTON,
Home Science Instructor,
Department of Agriculture,
Wellington

Scotch Pancakes and Girdle Cakes

SCOTCH pancakes may be better known as pikelets. Recipes for them are many and varied, but the one below is always successful provided the cooking surface is at the right temperature. It is ready for baking when water dropped on it forms globular drops. The pikelet's under surface should be golden brown by the time it rises and bubbles come to its surface but do not burst.

2 oz of sugar
4 oz of flour
1 egg
½ cup of milk
2 teaspoons (level) of cream of tartar
1 teaspoon (level) of baking soda
½ oz of butter (melted)

Sift the flour, baking soda, and cream of tartar into a mixing bowl. Make a hollow in the centre and stir in the unbeaten egg, the milk, and the butter in that order. Leave to stand for a few minutes, then cook in dessertspoonfuls. When the underside is cooked, turn the pikelet, using a spatula, and cook the other side. Makes 16 to 18 pikelets.

Girdle Cakes

The same mixture, with the milk increased to ⅔ of a cup, makes girdle cakes. The batter can be beaten with a rotary beater until thoroughly mixed. Pour the batter from a jug on to the cooking surface. Cook not more than three cakes at a time. When the third cake has been poured the first should have a rim of bubbles round the edge. Turn with a spatula and cook until brown on the other side. Serve immediately with maple syrup. Makes 12 to 14 cakes.

—MAUD B. STRAIN,
Home Science Instructor,
Department of Agriculture,
Dunedin

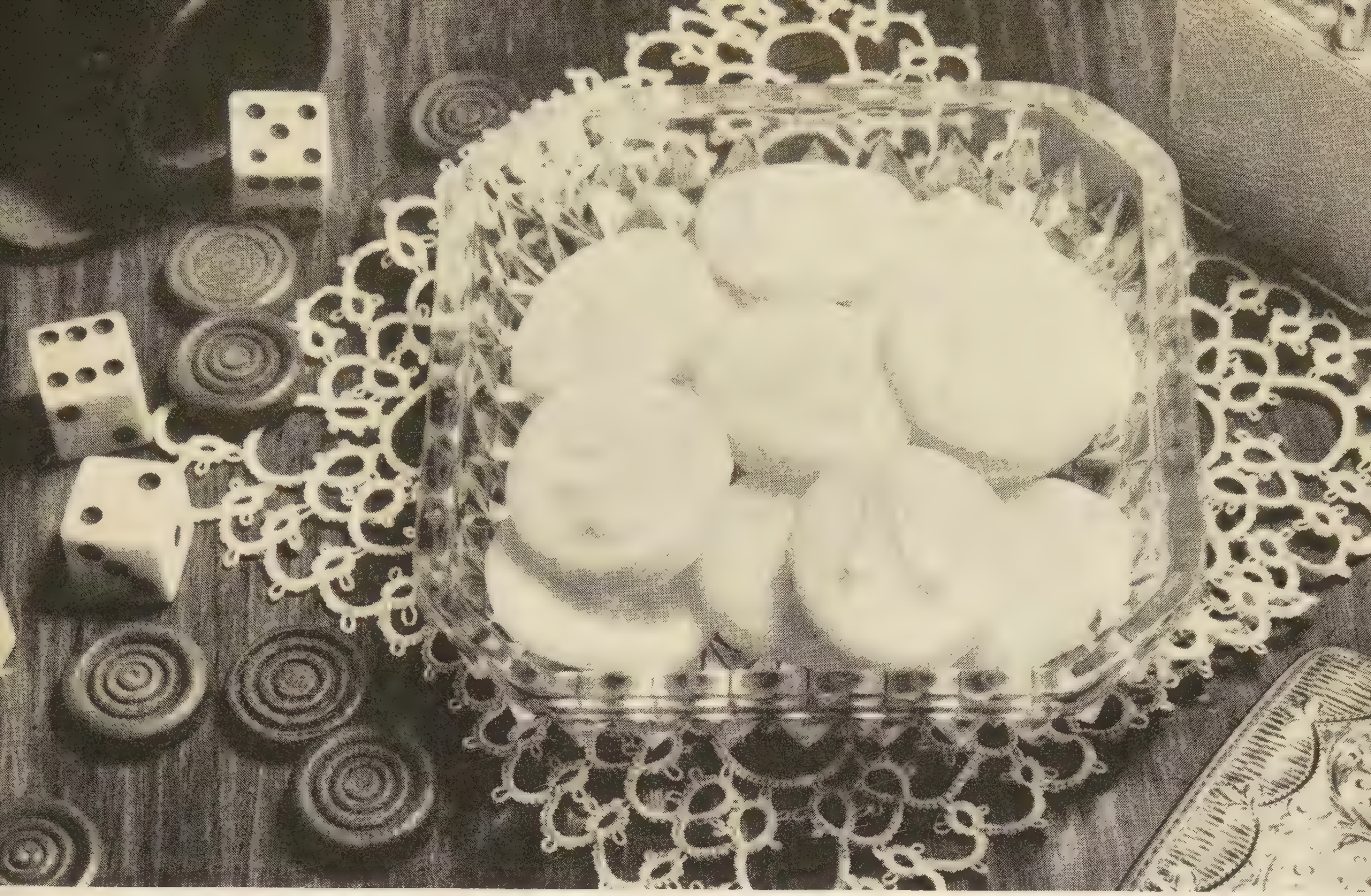
Lemon-Pineapple Sherbet

HERE is a recipe for a delicious dessert to follow a curry. It is cooling, fruit flavoured, and mildly sweet.

3 level dessertspoons of gelatine
1½ cups of hot water
¾ cup of sugar
4 cups of milk
1½ cups of cream
½ cup of lemon juice
1 teaspoon of grated lemon peel
16 oz tin of drained crushed pineapple

Dissolve the gelatine in the hot water. Add the sugar, milk, cream, lemon juice, lemon peel, and pineapple. Beat well. Freeze in refrigerator tray until firm. Break chunks into a bowl and then beat with the electric or rotary beater until fluffy. Return to the cold tray and freeze until firm, about 2 hours. This will provide 8 to 10 servings.

—JANET W. ROBERTS,
Home Science Instructor,
Department of Agriculture,
Auckland



[Sparrow

Sweets are Simple to Make

IT is fun to make sweets once in a while. The children will probably all want to join in, either to help or to sample, and the old fashioned "taffy time" will be on again.

By GWYNNETH V. BOSTOCK,
Home Science Instructor,
Department of Agriculture,
Palmerston North

SWEETS should always be eaten in moderation; in excess they spoil the appetite for more nutritive food. As refined sugar is a concentrated form of the sugar available from fruit and vegetables, it supplies heat and energy for our bodies in a stronger form and so for a shorter time.

Sweets make a delightful and novel gift, as they pack and carry well. Boxes of home-made sweets, attractively packed, are useful money makers on stalls and at bazaars beside being firm favourites with children for Christmas or birthdays.

However, you do not want to waste your time and expensive ingredients producing sticky toffee or coarse, crumbly fudge or fondant that will not set. A sugar thermometer is a good investment, as it ensures that the sweets are cooked to the right stage and will be successful. With it you can find out exactly what such terms as soft ball, hard ball, soft and hard crack, and caramel mean. It is recommended too for the beginner so that she can avoid vague recipes where cooking times are given; cooking quickly in a large saucepan will cause overcooking compared with cooking slowly in a small saucepan for the same time.

If you do not want to become involved with sugar cookery, attractive and novel uncooked sweets can be made.

Principles of Sugar Cookery

Sweet making is an art and before this art is mastered the principles of sugar cookery must be understood.

Sugar is the basis of sweet making. The crystals of granulated sugar are large and uneven with well defined angular edges. They can be dissolved in water and heated, forming new crystal shapes on cooling which are either small and fine so that they are creamy to the tongue or large and hard as in rock candy.

Controlling this recrystallisation is the most important part of sugar cookery. It depends on two things: the amount of "interfering" substances added to the sugar and water mixture and the temperature to which it is cooked.

The interfering substances prevent the sugar crystals collecting together in a hard mass. Only small amounts of them are needed for those sweets cooked at lower temperatures, such as fudge, and much larger amounts are needed for the hard rock candies cooked at higher temperatures. Substances used to interfere in the recrystallisation are glucose, corn syrup, cream of tartar, lemon juice, or vinegar.

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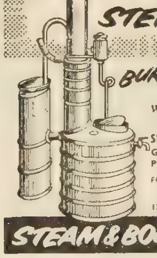

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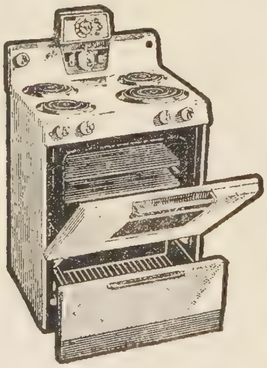

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To be controlled, the temperature of the boiling syrup must be taken at frequent intervals. If you do not have a thermometer, take a quarter teaspoon of the boiling syrup and drop it into a cup or bowl of very cold water (see table below).

Watch carefully as the temperature rises, removing the saucepan from the direct heat when the thermometer registers 3 to 5 degrees F below that required, as the heat of the pan will be sufficient to take it up the last few degrees.

There are five important stages of temperature in sugar cooking, at each of which a different type of sweet is produced. Here is a useful chart describing these stages for 2 lb of sugar in half a pint of water.

Boiling time (approx.)	When dropped in cold water it forms	Temperature (degrees F)	Sweet
10 minutes ..	Soft ball (flattens easily on removal from the water)	235 to 240	Fondant, coconut ice, and fudge
15 minutes ..	Firm ball (can easily be picked up and moulded in the fingers)	244 to 248	Caramels and marshmallow
15 to 20 minutes	Hard ball (solidifies into a chewy plastic lump)	250 to 265	Nougat
20 to 30 minutes	Soft crack (separates into threads which bend when poured into cold water). Higher temperatures produce threads which are brittle and break sharply	270 to 290	Creamed toffee, butterscotch, pulled sweets, hard toffee, and rock candy
30 minutes onward	Caramel (turns golden brown and crackles). Care must be taken not to burn it	310 upward	Caramel (very hard)

On humid days, the higher temperature of the two given produces sweets of the right consistency.

Boiling concentrates the syrup solution, as in jam making, and it becomes very sensitive so that crystallisation takes place immediately there is any movement or if any ingredients are added. If it is beaten or stirred before it cools, the sweets will be granular, coarse, solid, and closely cemented together, but if the syrup is allowed to cool untouched to room temperature and then beaten vigorously, very small, fine crystals which are soft and creamy, will be formed.

Boiling

All the sugar should be dissolved before it boils so that stirring is not necessary when the solution becomes more concentrated. When crystals of sugar are thrown on to the sides of the pan they should be washed down with a pastry brush or a piece of damp muslin wound round a fork; otherwise they are apt to fall in later and start the sugar crystallisation.

Cooling

Pouring the syrup out for cooling should be done very carefully with as little jarring as possible. The syrup should not be scraped out of the pan and should be left untouched until it reaches room temperature.

Beating

Beating should continue until the mass is thoroughly recrystallised; if it is not, the uncrystallised sugar when left standing will recrystallise in large, coarse crystals, and the sweets will be sugary, or grainy.

Equipment

The equipment required is not expensive; a sufficiently large aluminium saucepan (this lessens the possibility of burning your sweets), a wooden spoon, and a greased enamel bowl are essential. A sugar thermometer and/or a bowl of cold water for testing the temperature of your sweets, waxed paper, and a cold surface (a terrazzo bench top is good for kneading fondant) are desirable.

Various other gadgets such as dippers for chocolates or a pastry brush to wash down crystals from the sides of a saucepan while fudges are cooking are useful but not essential. For example, a piece of damp muslin wrapped round a fork will do instead of a pastry brush.

Method

Whatever the type of sweets, the method is basically the same.

Step 1: Dissolve the sugar in water or milk, add the interfering substance if included in the recipe and any other ingredients necessary, and heat.

Step 2: Gently stir until all the sugar is dissolved and the mixture starts to boil. Wash down any crystals thrown up on to the sides of the pan with a fork wrapped in damp muslin.

Step 3: Boil until the required temperature is reached. Test the temperature either by thermometer readings or cold water tests. To prevent burning, move occasionally on and off an asbestos mat without shaking the mixture. Make sure the syrup does not stop boiling.

Step 4: When cooked, pour the syrup into a greased bowl or tin. Do not scrape the saucepan.

If you do not have a sugar thermometer, drop the hot syrup into cold water to test the temperature.

Useful Substitutions

1 teaspoon of cream of tartar = 12 oz of corn syrup (minus ¼ cup of liquid in recipe)
1 cup of granulated sugar = 1¼ cups of brown sugar
1 cup of molasses = ½ cup of sugar + ¼ cup of liquid
1 cup of honey = ¾ cup of sugar + ¼ cup of liquid
1 oz (one square) of chocolate = 3 tablespoons of cocoa + 1 tablespoon of fat

Step 5: Allow to cool to room temperature. Do not stand it in cold water, but allow to cool gradually.

Too much cream of tartar, lemon juice, vinegar, or corn syrup will make the sweets sticky, soft, or runny so that they will not set.

RECIPES

Standard measuring cups (8 fl. oz.) and standard measuring spoons are used. All measurements are level.

Toffees (270 to 310 degrees F)

Lollypops

2 cups of sugar
⅔ cup of corn syrup
Colouring
1 cup of water
½ teaspoon of flavouring
12 wooden skewers

Cook sugar, water, and syrup to 290 degrees F. Cool slightly, flavour, and colour. Put over a pan of hot water.

Drip from tip of tablespoon on to a greased slab and insert the skewers immediately. Decorate while hot, using blanched almonds, candied cherries, raisins, jelly beans, or angelica.

Toffee Apples

6 to 8 apples not more than 2 in. across (must be sound)
1 lb of sugar
2 oz of glucose
2 tablespoons of golden syrup
¼ pint of water
Wooden skewers

Wash and wipe the apples. Insert a skewer into the end of each one, thrusting it about halfway into the apple. Boil the other ingredients together to 285 degrees F.

Dip the apples in the toffee. Tilt the saucepan so that each apple can be completely sealed when dipped. Stand them to set on a flat, greased dish.

Any surplus toffee can be poured into a greased dish and cut into pieces when set.

Plain Toffee

1 lb of sugar
1 tablespoon of malt vinegar
¾ pint of water

Dissolve the sugar in the water and vinegar over a gentle heat. Boil to 280 degrees F or until a few drops make a brittle thread in water. Pour into a greased tin. Mark into squares when half set. It breaks easily by rapping sharply with a hammer.

It should be wrapped in waxed paper or placed in an airtight container immediately it cools to prevent its becoming sticky.

Honeycomb Toffee

1 cup of sugar
1 tablespoon of honey
1 tablespoon of vinegar
1 tablespoon of butter
½ teaspoon of bicarbonate of soda

Use a large saucepan, as this mixture froths up when the bicarbonate is added. Use a greased Swiss roll tin to set it in.

Dissolve the bicarbonate in two teaspoons of hot water. Gently heat the ingredients except the bicarbonate, until the sugar has dissolved, and boil until 310 degrees F. Remove from the heat and stir in the bicarbonate.

Spread quickly on to a greased tray, stirring all the time. It is ready to eat in five minutes.

Peanut Brittle

1 cup of sugar
1 cup of water
¼ teaspoon of salt
¼ teaspoon of bicarbonate of soda
1 cup of blanched peanuts
½ cup of maple syrup, honey, or corn syrup
1 to 2 teaspoons of butter

Heat the sugar, syrup, and water gently together until dissolved. Cook to 235 degrees F (soft ball stage) and mix in the peanuts. Continue cooking to 290 degrees F (hard crack), taking care not to let it burn.

Remove from the heat, add the salt, butter, and soda, and pour on to well greased enamel or tin plates. While it is cooking lift up round the edges to prevent it sticking, using a flexible knife or spatula. As soon as it is firm enough, turn it over and mark into squares.

Break into pieces when cold. Wrap in waxed paper and store it in an airtight container.

Caramels (244 to 248 degrees F)

Basic Caramel Recipe

2 cups of sugar
1 cup of sweetened condensed milk
1 cup of milk
2 teaspoons of vanilla essence
½ cup of maple syrup or honey
½ cup of cream
¼ cup of butter

Cook all the ingredients except the vanilla essence over a gentle heat until 246 degrees F (firm ball stage). Remove from the heat, stir in the essence, and turn into a greased dish.

When cold remove from the dish, cut into squares, and wrap in waxed paper. Yields approximately 70 caramels.

Variations

Nut caramels: Mix in 1½ cups of chopped nuts after removing from the heat.

Fruit caramels: Mix in ¾ cup of chopped figs, dates, and raisins after removing from the heat.

Chocolate caramels: Add four squares of chocolate, cut into small pieces, before heating.

Jellies

Marshmallows

1 oz of gelatine
1 lb of sugar
1½ cups of water
1 teaspoon of vanilla essence
⅛ teaspoon of salt

Soak the gelatine in half the water. Place the sugar, salt, and the rest of the water in a saucepan and boil to 240 degrees F (firm ball stage). Remove from the heat, pour over the gelatine, and cool to room temperature. Add the flavouring and beat with an egg beater until the mixture is thick and creamy.

Pour into a pan that has been dusted with icing sugar and cornflour. Cool to set. Turn on to a board and cut into squares. Roll in coconut, finely chopped nuts, or icing sugar. Cornflour is very good too, as it does not become sticky.

Turkish Delight

2 lb of sugar
1¼ pints of water
Flavouring
2 oz of gelatine
¼ teaspoon of citric acid
Colouring

Soak the gelatine in the water. Add the sugar, stirring all the time until dissolved. Boil to 236 degrees F (soft ball stage). Add the citric acid, and the colouring and flavouring essences and pour into wet plates or pans. Leave to set for 24 hours.

Cut into oblongs and toss each piece in a mixture of icing sugar and cornflour.

Fudges (235 to 240 degrees F)

Chocolate Fudge

2 cups of sugar
½ to 1 teaspoon of vanilla
½ to 1 oz of butter
¾ cup of milk
1 to 2 oz of plain dark chocolate

Put all the ingredients except the vanilla and butter in a saucepan and heat gently, stirring continuously until the sugar and chocolate have dissolved and the mixture has boiled. Cook until 238 degrees F (soft ball stage). Remove from the heat, add the butter and vanilla, and cool until room temperature. Beat until creamy and thick.

Turn into a greased tin or plate and cut into squares. Yields 25 to 30 pieces.

Variations

Cocoa fudge: Substitute 1 to 2 oz of cocoa for the chocolate and increase the butter to 1½ oz. Mix the cocoa with the sugar before adding the milk.

Nut fudge: Add ¼ cup of broken nuts just before beating.

Fruit fudge: Add ½ cup of raisins, cut figs, dates, or crystallised ginger before beating.

Ginger fudge: Substitute 1 tablespoon of golden syrup and 1 tablespoon of ground ginger for the chocolate.

Ginger Biscuit Fudge

2 cups of sugar
½ tin of condensed milk
1 tablespoon of golden syrup
4 oz of butter
½ cup of fresh milk
½ lb of gingernuts, crumbed
½ cup of chopped walnuts
1 teaspoon of vanilla

Boil the sugar, condensed milk, golden syrup, butter, and fresh milk very slowly until golden brown (about 30 minutes). Beat to a cream. Add the biscuits, vanilla, and walnuts.

Pour into a dish to set and cut into squares when cool.

Coconut Ice

2 lb of sugar
6 oz of desiccated coconut
½ to 1 oz of butter
Pink colouring
½ pint of water
½ teaspoon of vanilla
¼ teaspoon of cream of tartar

Dissolve the sugar and cream of tartar in the water over a gentle heat, stirring to prevent burning. Heat until it boils at 238 degrees F (soft ball stage), then remove from the heat. Add the butter and vanilla and cool to room temperature. Stir in the coconut and beat.

When thick and creamy pour half into a greased dish. Tint the other half pale pink and pour on top. Cut into squares when stiff. Yields 26 to 36 pieces.

Fondant

2 lb of sugar
½ teaspoon of cream of tartar
1½ cups of water

Dissolve the sugar and cream of tartar in the water over a low heat. Boil without stirring to 238 degrees F (soft ball stage). Pour into a bowl and cool to room temperature. Beat until thick and creamy.

Turn on to a large plate, tray, or terrazzo bench top, and knead until smooth. It is now ready for use for filling for dates, walnut creams, peppermint creams, etc.

[Sparrow

A basket of chocolate nut fudge makes an attractive and toothsome gift.

Variations

Chocolate fondant: Knead 2 oz of melted chocolate into one cup of fondant.

Fondant balls: Shape fondant into balls and top with an almond, nut, or piece of crystallised fruit.

Peppermint creams: Knead the fondant in oil of peppermint, a drop at a time, and pale green colouring if desired. Roll out, cut in rounds, and stand them overnight on waxed paper to harden.

Uncooked Sweets

Truffles

5 tablespoons of icing sugar
2 tablespoons of cocoa
2 tablespoons of full cream dried milk
1 tablespoon of butter
2 oz of chopped walnuts
1 oz of ground almonds
½ teaspoon of rum essence
Squeeze of lemon juice
1 tablespoon of apricot jam
Chocolate shot for coating

Mix all the ingredients together in a basin. Add a tablespoon of boiling water and work into a sticky ball, adding a little fresh milk if necessary. Allow to stand for 10 minutes. Form into small balls and shake in chocolate shot to coat evenly.

Fruit Fingers

Put raisins, dates, glace cherries, and nuts twice through the mincer and moisten with sweetened condensed milk, but not too much. Form into small fingers and roll in chopped nuts, chocolate shot, or castor sugar.

Fruit Balls

1 cup of raisins
½ cup of peanut butter
¼ teaspoon of cocoa
1 teaspoon of cinnamon

Mix the raisins and the peanut butter. Form into balls. Sift the dry ingredients and roll balls in this. Place on waxed paper until firm.

Coconut Balls

2 tablespoons of condensed milk
2½ cups of shredded coconut
¼ cup of dates
½ cup of walnuts

Put the walnuts, dates, and two cups of coconut through a grinder. Mix to a paste with the condensed milk. Shape into round balls and roll in the rest of the coconut.

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